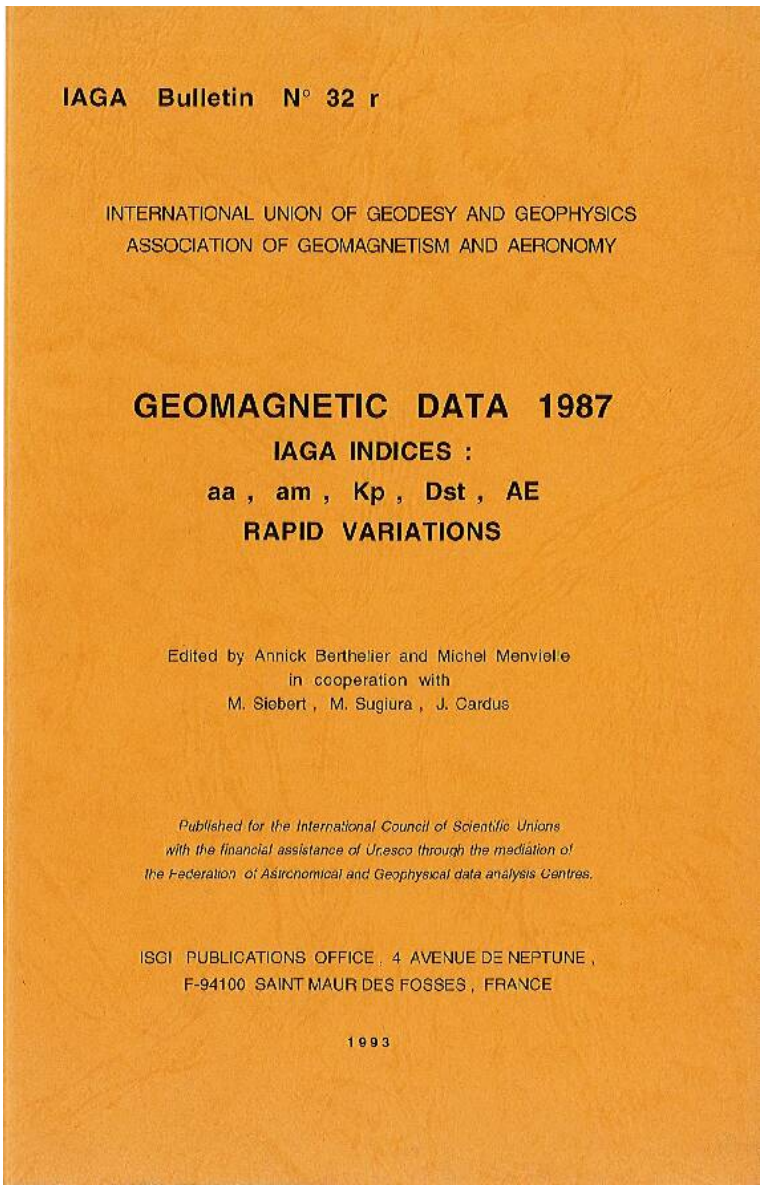



How to cite:

**Berthelier, A., Menvielle, M., Siebert, M., Sugiura, M., Cardus, J. O., & IAGA (1993). *IAGA Bulletin No. 32r, Geomagnetic Data 1987, IAGA INDICES: aa, am, Kp, Dst, AE, Rapid Variations.* ISGI Publications Office. https://doi.org/10.25577/dbtv-rj82**

IAGA Bulletin N° 32 r

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS
ASSOCIATION OF GEOMAGNETISM AND AERONOMY

# GEOMAGNETIC DATA 1987

## IAGA INDICES :

## aa , am , Kp , Dst , AE

## RAPID VARIATIONS

Edited by Annick Berthelier and Michel Menvielle
in cooperation with
M. Siebert , M. Sugiura , J. Cardus

*Published for the International Council of Scientific Unions*
*with the financial assistance of Unesco through the mediation of*
*the Federation of Astronomical and Geophysical data analysis Centres.*

ISGI PUBLICATIONS OFFICE , 4 AVENUE DE NEPTUNE ,
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## FOREWORD

While keeping the Bulletin 32 series as homogeneous as possible, the general informations are updated in each issue, and we try to improve contents and presentation as well.

The publication of the list of rapid variations (ssc and sfe) has been suspended between 1982 and 1985. From 1985 onwards, the data are in the Bulletin for the corresponding year. The lists of ssc for 1982-1985 appear in Bulletin 32p (1985) and we give in this Bulletin 32r (1987) the lists of sfe for 1982-1984.

In this Bulletin 32r for 1987 we have added a floppy having the same contents than the Bulletin (except for the rapid variations). A softwave for visualizing the tables is also included. The floppies corresponding to the years 1981-1986 have also been prepared, and are now available on request at ISGI Publication Office.

Annick Berthelier, Michel Menvielle


## *ACKNOWLEDGEMENTS*

*We wish to acknowledge J. O. CARDUS, M. SIEBERT, and M. SUGIURA for their cooperation in preparing the data published in this Bulletin. Thanks are also due to all the organisations, which support efficiently the preparation and distribution of these geomagnetic data (as listed in Table 1, page 8).*

*Let us add that M. SUGIURA, who moved from the Goddard Space Flight Center (Maryland, U.S.A.) to the WDC-C (Kyoto, Japan ; see Table 1) in 1985 and is now at the Tokai University (Tokyo, Japan), wishes specially to acknowledge the valuable assistance of R. S. KENNON (Goddard Space Flight Center) and T. KAMEI and T. ARAKI (Data Analysis Center for Geomagnetism and Space Magnetism, Kyoto University) in the derivation of the indices and in the preparation of the published tables and figures, respectively for the Dst and for the AE indices.*

*As for us, we are pleased to express our thanks to Caroline HUC and Christine GUERIN for their contribution to this Bulletin.*


*Annick. Berthelier, Michel. Menvielle*

*Saint-Maur, Orsay, Juin 1993*

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## SECTION 1

# PRESENTATION OF THE BULLETIN


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## 1.1. INTRODUCTION

The IAGA Bulletin N°32 series is a yearly compilation of magnetic indices and other geomagnetic data, based on the report of a great number of magnetic observatories. The series is the continuation of the former IAGA Bulletin N°12 and is prepared for publication by the International Service of Geomagnetic Indices (ISGI). The ISGI, formerly called Permanent Service or "C- and K-center", operates under the supervision of IAGA Division V : Observatories, Instruments, Surveys and Analysis. Since 1954, it forms part of the Federation of Astronomical and Geophysical Data Analysis Centers. Its present address is :

ISGI, CRPE - CNRS, 4 Avenue de Neptune,
F - 94107 Saint-Maur des Fossés CEDEX, FRANCE.

As for 1987, the elaborated data were provided by the following Institutes, under the responsability of the adjoining collaborators :

- Institut für Geophysik, Göttingen (M. SIEBERT) :
  Kp, ap, Ap, Cp, Q- and D-days.

- Institut de Physique du Globe de Paris, Paris (M. MENVIELLE) :
  aa, C- and K-days, an, Kn, An, as, Ks, As, and am, Km, Am.

- Data Analysis Center for Geomagnetism and Spacemagnetism, Kyoto (M. SUGIURA) :
  Dst, AL, AU, AE.

- Observatorio del Ebro, Roquetas (J.O. CARDUS) :
  Rapid Variations.

The work began in 1906 with the collection and publication of the daily character figure C and the international character figure Ci, together with the lists of selected quiet and disturbed days. In 1938, this work was extended backwards to 1890.

The three-hourly K-index (scale 0-9) was introduced by Bartels in 1938. From the K figures of 12 selected stations, planetary indices Kp were derived. Both K and Kp were officially adopted by the IAGA in 1951 and the series of Kp was extended backwards to 1932 during the subsequent period. The K figures of the selected stations for these early years were published in IAGA Bulletins N°12g and 12l. In addition to Kp, the corresponding range figures ap and related daily indices Ap and Cp have been regularly published in the IAGA Bulletin N°12.

In accordance with recommendations of the IAGA Assemblies in Madrid (1969) and in Moscow (1971), the publication in the IAGA Bulletins of C- and K-indices of individual observatories ended with the 1969 data, whereas planetary indices (Dst, an, Kn, An, as, Ks, As, am, Km, Am) and a survey of magnetic storms were included since 1970.

This change marked the end of the IAGA Bulletin N°12 series and the beginning of the new IAGA Bulletin N°32 series. The publication of the Ci, Kp, ap, Ap indices, and of the international quiet and disturbed days, Q- and D-days, continued in the new series. According to a recommendation of the IAGA Assembly in Grenoble (1975) a new index aa is published instead of Ci since 1976 and the C-figures are no longer compiled.

A short recall of the definition of the published indices is given in the section 1.3 below (pages 13-21). For more details, one can refer to the following reports :

- M. Siebert, in "Handbuch der Physik", vol.49/3, 206-275, Springer Verlag, 1971, for the description of several indices;

- P. N. Mayaud, *Derivation, Meaning and Use of Geomagnetic Indices*, Geophysical Monograph 22, Am. Geophys. Union, Washington D.C., 1980, for a completereview of the present IAGA indices;

- G.K. Rangarajan, *Indices of geomagnetic activity*, in "Geomagnetism", edited by J.A. Jacobs, Academic, San Diego, 1989;

- M. Menvielle and A. Berthelier, *The K-derived planetary indices: description and availability*, Rev. Geophys., 29, 3, 415-432, 1991.

Indications concerning their availability are given below, together with some more references.

- The *K-indices* of individual observatories are available on magnetic tape for the years 1969-1974, at the World Data Center A (WDC-A, Table 1-a). Besides, tables of local K-indices can be found in the bulletins or yearbooks of many observatories. The results of an extensive study on the K index by P. N. Mayaud are given together with practical rules for its determination in the "Atlas des indices K", IAGA Bulletin N°21, 1967.

- The *aa-indices* form a series of indices beginning in the year 1868. A full description can be found in the IAGA Bulletin N°33, which contains tables and graphs of aa for the years 1868-1967. Values for the years 1968-1975 are published in the IAGA Bulletin N°39; this index is regularly published in the IAGA Bulletin N°32 since 1976. The whole series is available on magnetic tape at World Data Center A (Table 1-a), and in France at the ISGI Publication office (Table 1-a). They also regularly appear in Geomagnetic and Solar Data monthly tables edited by H. Coffey in Journal of Geophysical Research and in Solar Geophysical Data Publications (Table 1-b). They can be sent on request by ISGI, by mail before the end of the next month, or by telex within 1 week (Table 1-a).

- The meaning of *C, Ci, K* and *Kp* is explained in textbooks (e.g. Landolt-Börnstein, Zahlenwerte und Funktionen, Band 3, 731-744, Springer Verlag, 1952), in Terrestrial Magnetism and Atmospheric Electricity (*44*, 411, 1939; *45*, 309, 1941) and in the IAGA Bulletin N°12i. Tables and diagrams of these planetary indices for the whole period 1932-1961 are printed in the IAGA Bulletin N°18. Kp, Ap, Cp are published in the IAGA Bulletin N°32, and also in the Geomagnetic and Solar Data monthly tables edited by H. Coffey in Journal of Geophysical Research and in Solar Geophysical Data

Publications (Table 1-b). They are sent on request before the end of the next month by the Institut für Geophysik, Göttingen (Table 1-b). They are available on magnetic tape at the World Data Centers (Table 1-a).

- The *three-hourly indices an, Kn, and as, Ks,* for the Northern and Southern hemispheres and the *mondial indices am, Km,* are described by P. N. Mayaud in "Indices Kn, Ks and Km, 1964-1967" (Editions du CNRS, Paris 1968). The indices for the years 1959-1963 are published in the IAGA Bulletin N°39, and for 1964-1967 in the above quoted publication. They are published in the IAGA Bulletin N°32 from 1968 onwards, and also appear in the Geomagnetic and Solar Data monthly tables edited by H. Coffey in Journal of Geophysical Research and in Solar Geophysical Data Publications (Table 1-b). They are available on magnetic tape at World Data Centers (Table 1-a) and in France at the ISGI Publication office (Table 1-a). They can be sent on request by mail from ISGI within 6 weeks after the end of the month (Table 1-a).

- The *equatorial Dst-index* is published in the IAGA Bulletin N°32 since 1970. Hourly values of Dst for the years 1957-1970, based on the data of three stations, have been published by M. Sugiura and D. J. Poros in the report X-645-71-278 of the Goddard Space Flight Center. Hourly Dst values for the IGY, based on the data of eight stations, are given in the Annals of the IGY, vol. 35. The same volume contains three-hourly values of Dst for the IGY as determined by Kertz in a somewhat different way. Recently, M. Sugiura and T. Kamei recomputed an homogeneous series of Dst values, using the data of four stations. These Dst indices values for the thirty years 1957-1986 are now published in the IAGA Bulletin N° 40. This report supersedes earlier Dst publications by Sugiura and co-workers. The hourly values from 1957 onwards are available on magnetic tape at the World Data Center (Table 1-a).

- The *auroral electrojet index AE* was originally introduced by Davis and Sugiura in 1966 (J. Geophys. Res., *71*, 785). It was first derived at the Geophysical Institute of the University of Alaska, and hourly values were published for the years 1957-1964 in the University of Alaska Reports prepared by T. N. Davis, Y. S. Wang and C. Echols, and published in 1967 and 1968. The data for 1965 were prepared by NASA ; from 1966 to 1976, they were prepared by WDC-A. Values from 1978 onwards are computed by the Data Analysis Center for Geomagnetism and Spacemagnetism of Kyoto University and published in the data books of this Institute. They are available on magnetic tape at the World Data Centers (Table 1-a). Hourly mean values are published in IAGA Bulletin N°32 since 1981.

- Data on *rapid variations* are collected and prepared for publication at the Observatorio del Ebro (Table 1-b), according to the decisions made at the IAGA Assemblies in Madrid (1969) and in Grenoble (1975). They are thus given less extensively than in the former IAGA Bulletins. Provisional lists are available on request at ISGI within 6 weeks after the end of the month (Table 1-b).

Tables 1 -a and -b (next page) give present address of the ISGI, of the World Data Centers, and of the National Institutes and Data Centers related to this bulletin.

TABLE 1

**a - ISGI and World Data Centers**

| | |
|---|---|
| ISGI | International Service of Geomagnetic Indices<br>Service International des Indices Géomagnétiques<br>CRPE -CNRS, 4, Avenue de Neptune<br>F-94107 SAINT MAUR DES FOSSES CEDEX, France<br>Telephone 33 1 45 11 42 40<br>Telex 264 498 OBSMAUR<br>Telefax 33 1 48 89 44 33 |
| WDC-A | World Data Center-A for Solar-Terrestrial Physics<br>NOAA code E/GC2, 325 Broadway<br>BOULDER, Colorado 80303, U.S.A.<br>Telephone 1 303 497 6324<br>Telex 592 811 NOAA MASC BDR<br>Telefax 1 303 497 6513 |
| WDC-B | World Data Center-B<br>Soviet Geophysical Committee, Academy of Sciences of the U.S.S.R.<br>Molodezhnaya 3<br>MOSCOW 117296, U.S.S.R.<br>Telephone 7 095 130 05 46<br>7 095 228 67 88<br>Telex 411 478 SGC SU |
| WDC-C | World Data Center-C for Geomagnetism<br>Data Analysis Center for Geomagnetism and Spacemagnetism<br>Faculty of Science, Kyoto University<br>KYOTO 606, Japan<br>Telephone 81 75 751 2111 ext. 3939<br>Telex 5422 693 LIB KYO J<br>Telefax 81 75 722 7884 |

**b - National Institutes and Data Centers**

| | |
|---|---|
| M. MENVIELLE | Laboratoire de Physique de la Terre et des Planètes<br>Batiment 504 - Université PARIS-XI<br>F-91405 ORSAY CEDEX, France |
| M. SIEBERT | Geophysical Institute, Göttingen University<br>Institut für Geophysik der Universitat Göttingen<br>Postfach 2341, Herzberger Landstrasse 180<br>D-3400 GOTTINGEN, Federal Republic of Germany |
| J. O. CARDUS | Observatorio del Ebro<br>Roquetas, TARRAGONA, Espagne |
| M. SUGIURA | Working Group on World Data Centers<br>National Committee on Solar-Terrestrial Physics<br>Science Council of Japan<br>Institute of Research and Development<br>Tokai University, 2 -28 Tomigaya, Shibuya-ku<br>TOKYO 151, Japan |

• Solar Geophysical Data monthly publications are issued by :
NOAA National Geophysic Data Center
NOAA, NESDIS E/GC4
325, Broadway
BOULDER, Colorado 80303, U.S.A.

## 1.2. LIST OF OBSERVATORIES

A list of the magnetic observatories at which continuous recordings have been made during at least five consecutive years is given pages 29-36. In this table, the observatories are listed according to the alphabetic order and one has indicated for each station, from left to right :

- its name and three-letter IAGA international code ;
- the geographic and geomagnetic coordinates, and altitude ;
- the K=9 lower limit, given only for the stations which belong to Kp, am or aa networks (see section 1.3 for the description of these networks in 1985) ;
- the opening and closing years.

Note that temporary stations do not appear in this table, as for instance those operating during the International Polar and Geophysical years, but they can be found in the more extensive list published in IAGA-Bulletin n° 20 (1965).

The values of the parameters given in the table has been obtained from the following publications :

- C.R. Bock and R.W. Schumann : Katalog der Jahres mittel der Magnetischen Elemente der Observatorien und der Stationen an deinen eine Zeitlang erdmagnetische Beobachtungen Stattfanden, Geophysikalisches Institut Postdam Abhandlungen n° 8, Postdam, 1948;
- Annual mean values of Geomagnetic elements, Geomagnetic Bulletin n°10, Institut of Geological Sciences, Edinburgh, 1981;
- Yearbooks of individual observatories.

A list of the stations having provided continuous recordings over at least fifty years is given on pages 37-38. When one observatory has moved, the names of the different consecutive sites are indicated. The stations are listed following the alphabetic order of the oldest observatory. One has indicated in this table the opening and closing years, as the other parameters can be found in the preceeding list.

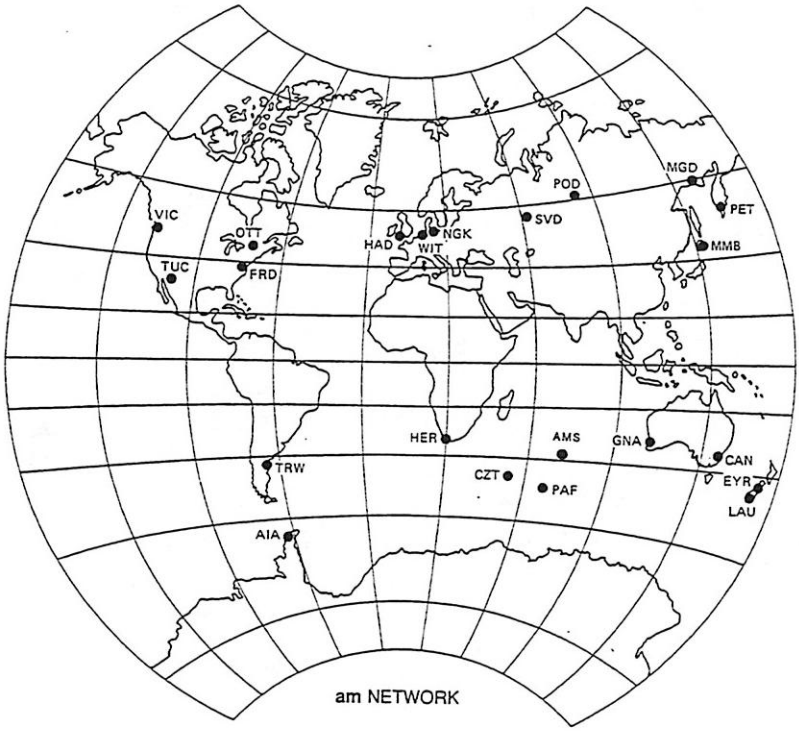



Figure 1 : Distribution of am observatories




Figure 2 : Distribution of Kp observatories

## 1.3. IAGA INDICES

### 1.3.1. aa indices

The aa indices are derived using data from two nearly antipodal observatories, where magnetograms were available since 1868. For each three hour interval, K indices are measured at the two stations and converted back into amplitude; an individual aa index is the average of the northern and southern values, weighted to account for the small difference in latitude of the two stations, or for the slight changes in the very place of the observatory. The observatories used to derive aa are given in Table 2-a (next page), with weighting coefficients given in brackets.

Half-daily and daily mean values give an estimate of the activity level very close to the corresponding values derived from am indices. aa is in nanotesla (nT) and it represents the activity level at an invariant magnetic latitude of about 50°. The following values are given pages 44-45 :

| | | |
|---|---|---|
| N | = | daily values for the Northern observatory (Greenwich day) |
| S | = | same for the Southern observatory |
| am, pm | = | half-daily values of aa indices for the half Greenwich day before, and after noon. |

For each month, the average value of daily N, S and aa, are given at the bottom of the tables.

Letters C and K indicate the quiet 24 and 48 hour intervals as obtained from aa : C = really quiet, K = quiet but with one or a few slightly disturbed three-hourly intervals (see section 4). The letter on the left column refers to the 24 hour Greenwich day, that on the right one to a period of 48 hours centered on the Greenwich noon. The asterisks mark the five international quietest days of the month (as deduced from Kp, see section 4).

A graph of 12-hour running mean values of aa indices is drawn page 43 for the whole year. Monthly and yearly mean values of aa for the years from 1868 onwards are listed pages 46-47. A graph of 12-month running mean values of aa is drawn page 48, covering the full period when aa has been calculated so far, i.e. 1868-1987. In this graph, the point plotted at the abscissa of a given year corresponds to the average of aa from January to December of that year (unit : nT).

### 1.3.2. am indices

am, an and as indices are derived from K indices scaled at observatories located in the subauroral zones of the Northern and Southern hemispheres (Figure 1). The stations are arranged in groups (G1 to G9), each group representing a longitude sector in one of the hemisphere (see Table 2-b, next page). The corrected geomagnetic latitude indicated in this Table has been calculated by Mayaud for taking into account the actual topography of the main field.

TABLE 2

**a - List of aa observatories**

| *Northern Hemisphere* | | | *Southern Hemisphere* | | |
|---|---|---|---|---|---|
| *Observatory* | | *Corr. Geom. Lat.* | *Observatory* | | *Corr. Geom. Lat.* |
| 1868-1925 | Greenwich *(1.007)* | | 1868-1919 | Melbourne *(0.967)* | |
| 1926-1956 | Abinger *(0.934)* | | 1920-1979 | Toolangui *(1.033)* | |
| 1957-... | Hartland *(1.059)* | 50.0° | 1980- ... | Canberra *(1.084)* | 45.2° |

**b - List of am observatories**

| | *Northern Hemisphere* | | | | *Southern Hemisphere* | | |
|---|---|---|---|---|---|---|---|
| | *Observatory* | | *Corr. Geom. Lat.* | | *Observatory* | | *Corr. Geom. Lat.* |
| G1 | Magadan | MGD | 53.8° | G6 | Eyrewell | EYR | 50.2° |
| | Petropavlosk | PET | 46.4° | | Canberra | CAN | 45.2° |
| | Memabetsu | MMB | 37.4° | | | | |
| G2 | Podkammenkaya | POD | 57.2° | G7 | Gnangara | GNA | 44.1° |
| | Sverdlovsk | SVD | 52.2° | | Amsterdam | AMS | 48.3° |
| G3 | Witteveen | WIT | 50.2° | G8 | Kerguelen | PAF | 58.8° |
| | Hartland | HAD | 50.0° | | Crozet | CZT | 52.4° |
| | Niemegk | NGK | 48.8° | | Hermanus | HER | 41.1° |
| G4 | Ottawa | OTT | 58.9° | G9 | Argentine Islands | AIA | 49.7° |
| | Frederiksburg | FRD | 51.8° | | Trelew | TRW | 27.8° |
| G5 | Victoria | VIC | 53.9° | | | | |
| | Tucson | TUC | 39.7° | | | | |

**c - List of Kp observatories**

| *Northern Hemisphere* | | | *Southern Hemisphere* | | |
|---|---|---|---|---|---|
| *Observatory* | | *Corr. Geom. Lat.* | *Observatory* | | *Corr. Geom. Lat.* |
| Meanook | MEA | 62.5° | Eyrewell | EYR | 50.2° |
| Sitka | SIT | 60.0° | Canberra | CAN | 45.2° |
| Lerwick | LER | 58.9° | | | |
| Ottawa | OTT | 58.9° | | | |
| Lovö | LOV | 56.5° | | | |
| Eskdalemuir | ESK | 54.3° | | | |
| Brorfelde | BJE | 52.7° | | | |
| Fredericksburg | FRD | 51.8° | | | |
| Wingst | WNG | 50.9° | | | |
| Witteveen | WIT | 50.2° | | | |
| Hartland | HAD | 50.0° | | | |

For a given time interval, the K values measured at the observatories of one group are averaged and converted back to amplitude. These amplitudes are weighted for balancing the differences in longitude width of the sectors, and the hemispheric averages of these weighted amplitudes give rise to the three-hour an and as indices respectively; am is equal to (an + as)/2. Am, An and As are the daily mean values of am, an and as. They are all expressed in nanoteslas.

For the sake of tradition and convenience, Km, Kn, Ks equivalent values are also made available by means of a conversion table (see below); they are as usually expressed by values from 0o to 9o, corresponding to the given interval of am (or an, or as).

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| am | 0.0 | 1.4 | 3.4 | 5.4 | 7.4 | 10.4 | 13.4 | 16.4 | 20.4 | 26.4 |
| Km | | 0o | 0+ | 1- | 1o | 1+ | 2- | 2o | 2+ | 3- |
| am | 26.4 | 33.4 | 40.4 | 50.4 | 60.4 | 70.4 | 86.4 | 103.4 | 120.4 | 146.4 |
| Km | | 3o | 3+ | 4- | 4o | 4+ | 5- | 5o | 5+ | 6- |
| am | 146.4 | 173.4 | 200.4 | 243.4 | 286.4 | 330.4 | 386.4 | 443.4 | 500.4 | 611.4 |
| Km | | 6o | 6+ | 7- | 7o | 7+ | 8- | 8o | 8+ | 9- 9o |

Monthly tables of an, and as are given pages 52-63, each line corresponding to a Greenwich UT day. Following values are displayed from left to right :

- Kn (Ks) values for the 8 three-hour intervals ;
- $\sigma$n ($\sigma$s) values for the 8 three-hour intervals represent, by a code using one digit from 0 to 9, the variance of the sector values of K in Northern (Southern) hemisphere calculated for each given three-hour interval;
- an (as) values for the 8 three-hour intervals ;
- An (As) daily mean value.

At the end of each table, one can find the monthly mean value.

Monthly tables of am (pages 64-69) are displayed in a similar way :

- Km values for the 8 three-hour intervals ;
- daily sum $\Sigma$ Km ;
- am values for the 8 three-hour intervals ;
- Am, daily mean value ;
- Am2, mean value of am over a 48 hours period centered at the middle of the Greenwich day.

Km values are displayed as "musical diagram" according to Bartels solar rotations (page 51). A compilation of the musical diagrams from 1959 onwards is available on request at ISGI Publication Office (Table 1-a). Monthly and yearly mean values of Am from 1959 onwards are given page 70.

### 1.3.3. Kp indices

The planetary three-hour-range index Kp is the mean standardized K-index from 13 observatories between 44° and 60° northern or southern geomagnetic latitude (Figure 2, and Table 2-c). The scale is 0o to 9o, expressed in thirds of a unit, e.g. 5- is 4 2/3, 5o is 5, 5+ is 5 1/3. This planetary index is designed to measure solar particle radiation by its magnetic effects.

The other indices derived from Kp are the three-hour index ap (the equivalent range), the daily indices Ap, the Cp and C9 characters that are related to the daily sum of ap.

The three-hour equivalent amplitude ap is deduced to Kp as follows :

| Kp | = 0o | 0+ | 1- | 1o | 1+ | 2- | 2o | 2+ | 3- | 3o | 3+ | 4- | 4o | 4+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ap | = 0 | 2 | 3 | 4 | 5 | 6 | 7 | 9 | 12 | 15 | 18 | 22 | 27 | 32 |

| Kp | = 5- | 5o | 5+ | 6- | 6o | 6+ | 7- | 7o | 7+ | 8- | 8o | 8+ | 9- | 9o |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ap | = 39 | 48 | 56 | 67 | 80 | 94 | 111 | 132 | 154 | 179 | 207 | 236 | 300 | 400 |

In order to use ap as an equivalent amplitude, it is considered in relation to the conditions at a standard station, which is a station having the lower limit of 500 nT for K = 9. At such a station the average range in nT of the most disturbed of the two horizontal components in a three-hour interval can be taken as 2 ap (for instance, for Kp = 3+, ap=18, ie 36 nT). In other words ap is an equivalent amplitude in the unit 2 nT. The column headed Ap gives the daily average for the eight values ap per day. Therefore, Ap may be called the "equivalent daily amplitude Ap", expressed in the unit 2 nT for a standard station.

Observatories wishing to compute, from their own K indices, a local equivalent amplitude ak, may proceed as follows :

| K = | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| ak = | 0 | 3 | 7 | 15 | 27 | 48 | 80 | 140 | 240 | 400 |

This table is valid for all observatories. Using the values of the table, ak has the meaning of an index. If it is desired to convert the index ak into an equivalent amplitude in the unit nT, the conversion factor is obtained from the lower limit for K = 9 valid at the station by dividing the limit by 250. For instance, at Sodankylä, where the lower limit for K = 9 is 1500 nT, the factor is 6, so that, for K = 3, the equivalent amplitude is 90 nT, or, in other words the index ak for Sodankylä expresses equivalent amplitudes in the unit 6 nT. Similary, Ak is the daily average of the ak. Use of the daily Ap (planetary) or Ak (local value) is recommended in preference to the sum of the indices Kp or K.

The last column gives the daily planetary character figure Cp, as defined in Bulletin 12e, page 111. It should be noted that Cp, introduced for a standardization of the international character figures Ci, has not been approved by the Association. Instead, Ap was preferred. For a rough conversion of Ci figures (prior to 1932) into Ap, the following table (derived from Bulletin 12e, page 111, their Table 2) may be used :

| 10.Ci = | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ap = | 2 | 4 | 5 | 6 | 8 | 9 | 11 | 12 | 14 | 16 | 19 | 22 | 26 | 31 | 37 | 44 | 52 | 63 | 80 | 110 | 160 |

Monthly tables of Kp and derived indices are given pages 74-79. Kp values are displayed as "musical diagrams" according to Bartels solar rotation page 73. These diagrams are also available on request at Geophysical Institute, Göttingen (Table 1-b). The frequencies of Kp indices is given by month page 80. Monthly and yearly mean values of Ap from 1932 onwards are given page 81.

### 1.3.4. Dst index

The Dst index for 1987 are derived using the data from the four magnetic observatories given in Table 3 .

These observatories were chosen on the basis of the quality of observation and for the reason that their locations are sufficiently distant from the auroral and equatorial electrojets and that they are distributed in longitude as evenly as possible. A map of the network is given in Figure 3 .

*The baseline*

The baseline for H is defined for each observatory in a manner that takes into account the secular variation. For each observatory, the annual mean values of H, calculated from the "five quietest day" for each month, form the data base for the baseline.

It should be remembered that the final Dst values are determined after each calendar year and that therefore in this determination the annual mean values are available only up to and including the year (referred to below as the current year) for which the Dst is to be deduced.

The baseline is expressed by a power series in time and the coefficients for terms up to the quadratic are determined by the method of least squares, using the annual means for the current year and the four preceding years. Thus, the baseline, $H_{base}$ is expressed as

$$H_{base}(\tau) = A + B\tau + C\tau^2 \qquad (1)$$

where $\tau$ is time years measured from a reference epoch.

It is noted here that if the polynomial expansion of the annual means is made in a straighforward manner as described above, an artificial discontinuity, although seldom large enough to be recognized by a casual inspection, can be introduced between the baseline value for the last hour of one year and that for the first hour of the following year, because these two baseline values are calculated from two different polynomials. To minimize such a discontinuity the polynomial determination is actually made in two steps.

From the polynomial expansion determined in the first step, the baseline value at the end of current year is calculated. In the second step, this value is included as an additional data point in the polynomial fitting. This procedure has been found to be satisfactory.

The baseline value $H_{base}(T)$ calculated from (1) for each UT hour of the current year is subtracted from the observed H value, $H_{obs}(T)$ :

$$\Delta H(T) = H_{obs}(T) - H_{base}(T) \qquad (2)$$

The deviations, $\Delta H(T)$, form the data base in the following derivation for each of the observatories.

TABLE 3

**List of Dst observatories**

| *Observatory* | *Symbol* | *Dipole Lat.* | *Dipole Long.* |
|---|---|---|---|
| Honolulu | HON | 21.0°N | 266.4° |
| San Juan | SJG | 29.9°N | 3.2° |
| Hermanus | HER | 33.3°S | 80.3° |
| Kakioka | KAK | 26.0°N | 206.0° |

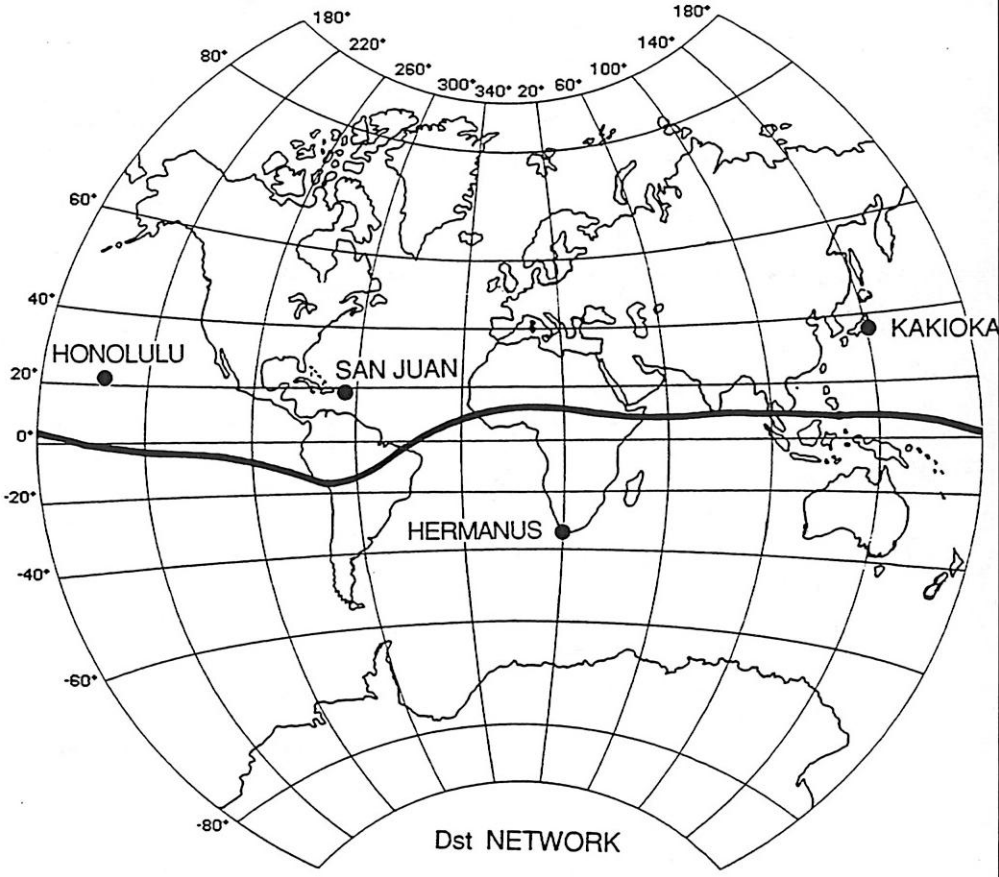



Figure 3 : Distribution of Dst observatories;
the solid line marks the magnetic dip equator.

*The Sq elimination*

The solar quiet daily variation, Sq, is derived for each observatory as follows. The average Sq variation for each month is determined from the values of H(T) for the internationally selected five quietest days of the month.

These quietest days are determined in UT. In order to define an average Sq variation for the local day of each observatory, we form the averages for the local hours using five quietest days. Also, using hourly values immediately before and immediately after the local days selected, we evaluate the linear change and subtract it from the Sq variation. In this manner we remove from Sq the noncyclyc change, which is part of Dst variation, and also evaluate Sq from the midnight level.

The 12 sets of the monthly average Sq so determined for the year are expanded in a double Fourier series with local time, t, and month number, s, as two variables:

$$S_q(t,s) = \sum_m \sum_n A_{mn} \cos(mt + \alpha_m) \cos(ns + \beta_n) \qquad (3)$$

This representation allows us to calculate Sq(T) at any UT hour, T, of the year. This procedure is applied to each observatory.

*The Hourly Equatorial Dst Index.*

For each observatory the disturbance variation, D(T), is defined by :

$$D(T) = \Delta H(T) - S_q(T) \qquad (4)$$

Then D(T) is averaged over the four observatories and normalized to the dipole equator by :

$$Dst(T) = \frac{D(T)}{\cos\varphi} \qquad (5)$$

where the denominator is the average of the cosines of the dipole latitudes, $\phi_i$ (i=1,4), of the observatories contributing to the average. This normalization procedure has been found to minimize undesired effects from missing hourly values.

Monthly tables of hourly Dst-values are given pages 87-98, followed by a table of mean values (page 99). The graph of hourly values for the whole year is given pages 85-86; the table of monthly and yearly mean values from 1959 onwards is given page 100.

TABLE 4

**List of AE observatories**

| *Observatory* | *Symbol* | *Geographic* | | *Geomagnetic* | |
|---|---|---|---|---|---|
| | | *Lat. (°N)* | *Long. (°E)* | *Lat.(°N)* | *Long. (°E)* |
| Abisko | ABK | 68.36 | 18.82 | 66.04 | 115.08 |
| Dixon Island | DIK | 73.55 | 80.57 | 63.02 | 161.57 |
| Cape Chelyuskin | CCS | 77.72 | 104.28 | 66.26 | 176.46 |
| Tixie Bay | TIK | 71.58 | 129.00 | 60.44 | 191.41 |
| Cape Wellen | CWE | 66.17 | 190.17 | 61.79 | 237.10 |
| Barrow | BRW | 71.30 | 203.25 | 68.54 | 241.15 |
| College | CMO | 64.87 | 212.17 | 64.63 | 256.52 |
| Yellowknife | YKC | 62.40 | 245.60 | 69.00 | 292.80 |
| Fort Churchill | FCC | 58.80 | 265.90 | 68.70 | 322.77 |
| Poste de la Baleine | PBQ | 55.27 | 282.22 | 66.58 | 347.36 |
| Narssarssuaq | NAQ | 61.20 | 314.16 | 71.21 | 36.79 |
| Leirvogur | LRV | 64.18 | 338.30 | 70.22 | 71.04 |

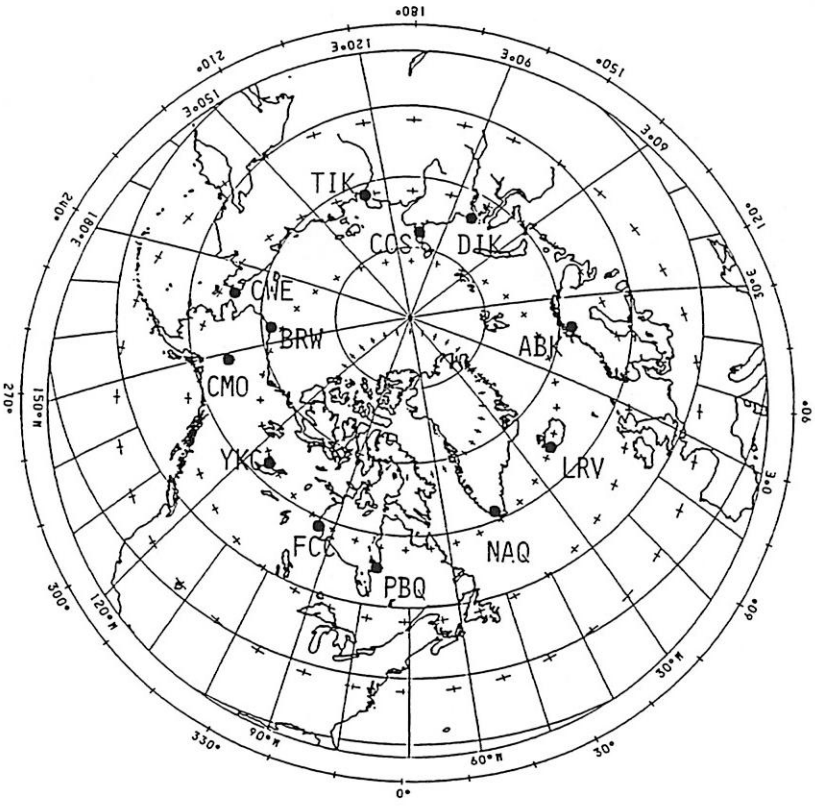



Figure 4 : Distribution of AE(12) stations

## 1.3.5. AE index

The AE indices are derived from geomagnetic variations in the horizontal component observed at selected observatories along the auroral zone in the northern hemisphere (Figure 4, Table 4). These variations are measured from a base line determined for each of the observatories. For each given time (UT), at one minute intervals the AU and AL indices are respectively defined as the maximum and minimum values among the one minute values of the variations from all the AE observatories at this UT. The AE index is defined by AU-AL, A0 is (AU+AL)/2.

For the sake of simplicity the term "AE (Auroral Electrojet) indices" is generally used to mean all the AE-associated indices, i.e. AU, AL, AE and A0. In a superposed plot of one minute values of H from all the AE observatories with a common time axis the AU and AL indices represent the upper and lower envelopes of the plotted points, respectively, and the AE value gives the separation of these envelopes.

The AU and AL indices are intended to represent a measure of the maximum current density of the eastward and westward auroral electrojets, respectively. The AE index represents a measure of global auroral electrojet activity.

One minute values of the AE indices (AU, AL, AE and A0) are calculated at the Data Analysis Center for Geomagnetism and Spacemagnetism, (same address as WDC-C, Table 1-a) and more detailed plots and tables are given in the Data Book series of the World Data Center C2 for Geomagnetism. One minute values of these indices are available on magnetic tape at the World Data Center-A for Solar Terrestrial Physics in Boulder, Colorado and at the World Data Center-C2 for Geomagnetism in Kyoto (See Table 1-a).

Tables of hourly averages of AU, AL and AE are given pages 104-127; graph is given page 103. The hourly averages of AU, AL and AE are computed from the one minute values of the respective indices, therefore they may not necessarily satisfy the relationship AU - AL = AE exactly. Similarly the daily mean indices are averages of the one minute values for the whole day and are not the daily means of the hourly averages. Monthly and yearly mean values from 1957 onwards are given page 128.

## 1.4. CLASSIFICATION OF DAYS

The list of the international five quietest days and the selection of the 24-hour and 48-hour intervals which are really quiet (C) or very quiet (K) are given month by month pages 131-132. They are presented on an annual diagram , for 1987, page 133. The list of the international quietest and of the more disturbed days, and a list of magnetic storms are also given page 134. These classifications are made according to the following.

### 1.4.1. Classification deduced from Kp indices

The selection of the quietest and most disturbed days of each month is made on the basis of three criteria :

(a) = the sum of the eight values of Kp ;
(b) = the sum of the squares of these values ;
(c) = the greatest of the eight values of Kp.

According to each of these criteria, a relative "order number" is assigned to each day of a month, the three order numbers are averaged and the days with the lowest and the highest mean order numbers are selected as the five quietest, the ten quietest and the five most disturbed days (Table page 134, with a list of magnetic storms).

It should be noted that these selection criteria give only a relative indication of the character of the selected days with respect to the other days of the same month. As the general disturbance level may be quite different for different years and also for different months of the same year, the selected quietest days of a month may sometimes be rather disturbed or vice versa.

In order to indicate such a situation, selected days which do not satisfy certain absolute criteria are marked as follows.

- A selected "quiet day" is considered "not really quiet" and is marked by the letter A if for that day : $Ap > 6$, or marked by the letter K if $Ap \leq 6$, with one Kp value greater than 3 or two Kp values greater than 2+.
- A selected "disturbed day" is considered "not really disturbed" and marked by an asterisk if $Ap < 20$. (see P.N. Mayaud, Ann. Géophys., *26*, 901, 1969).

### 1.4.2. Classification deduced from aa indices

The selection of the quiet 24-hour intervals is made firstly on the basis of the mean value of aa which must be lower than the fixed value : 13 nT. Then, each individual aa value of the day is represented by a weight p, namely :

| p | 0 | 1 | 2 | 4 | 6 |
|---|---|---|---|---|---|
| aa | $\leq 17$ | $17 < aa \leq 21$ | $21 < aa \leq 28$ | $28 < aa \leq 32$ | $> 32$ |

A day with a mean value of $aa \leq 13$nT and for which $\sum p$ is higher than, or equal to 4 is a quiet K-day ; if $\sum p$ is lower than 4, the day is a really quiet C-day.

The same rules are applied to select the 48-hour quiet or really quiet intervals, with the same limit for the aa mean value (13 nT) and a limit for $\sum p$ equal to 6. One has to note that in these intervals every local day (0 h to 24 h in local time) is really quiet, at any longitude. For further details, see P. N. Mayaud, Derivation, Meaning and Use of Geomagnetic Indices, Geophys. Monograph 22, Am. Geophys. Union, Washington 1980.

## 1.5. RAPID VARIATIONS

### 1.5.1. Storm sudden commencements (ssc)

The old definition, that said that "an ssc is a sudden commencement of a magnetic storm", is now changed into "sudden commencements followed by a magnetic storm *or* by an increase in activity lasting at least one hour".

The change was introduced by P. N. Mayaud (IAGA Bulletin 33 : "*A Hundred Years Series of Geomagnetic Data, 1868-1967. Indices aa and storm sudden commencements*"; see also IAGA Bulletin 39 : "*Supplementary Geomagnetic Data 1957-1975*", including a new list of ssc's 1968-1975). In this new definition more importance is given to the change of rhythm in the magnetic activity, than to the amplitude of the magnetic storm, and therefore some ssc's included in the list are not followed by a real magnetic storm.

The routine procedure of the Service in establishing the final list consists essentially of several steps, following as much as possible the instructions given by Mayaud in order to get a continuous series of homogeneous data.

*Step 1.* From the monthly reports of Rapid Variations prepared by 43 magnetic observatories (see list page 139), a combined list of all events is compiled.

*Step 2.* This list is checked against the magnetograms of two low latitude observatories (HON and EBR), and cases reported by only a very few observatories and that are clearly not an ssc in the magnetograms of HON and EBR, are eliminated.

*Step 3.* All other cases are then included in a new list, and copies of the magnetograms are requested for all of them from the five collaborating low latitude observatories, that are regularly spaced in longitude (Table 5a), or from their supplementary observatories (Table 5b).

*Step 4.* From the copies of the magnetograms sent by the five observatories as a reply to Step 3, every ssc is evaluated independently for each observatory and a number (0 to 3) is assigned to each event, in the following scale :

0. the event could have escaped the attention of the observers or does not deserve to be called an ssc,
1. the event is possibly an ssc, but is not clear enough in itself to be identified as a true ssc without inspection of other records at different longitudes,
2. the event can be unmistakably identified as an ssc from the single record on consideration,
3. is assigned, instead of 2, where the event presents a very sharp change of rhythm in the agitation, has a large amplitude and its general morphology is remarkable.

If an event gets three codes 0, out of the five observatories, it is rejected from the list.

*Step 5.* Finally the duration, in minutes, and the amplitude, in nT, from the copies from the five observatories are measured and their mean values are calculated.

TABLE 5

**a - Collaborating Observatories for Rapid Variations**

| *Observatory* | *Symbol* | *Geographic* | | *Geomagnetic* | |
|---|---|---|---|---|---|
| | | *Lat. (°N)* | *Long. (°E)* | *Lat. (°N)* | *Long. (°E)* |
| MBOUR | MBO | 14.40 | 343.02 | 20.68 | 56.80 |
| FUQUENE | FUQ | 5.47 | 286.27 | 16.47 | 357.07 |
| HONOLULU | HON | 21.32 | 202.00 | 21.46 | 268.57 |
| PORT MORESBY | PMG | -9.40 | 147.15 | -17.99 | 219.75 |
| ALIBAG | ABG | 18.63 | 72.87 | 9.64 | 145.39 |

**b - Supplementary Observatories**

| *Observatory* | *Symbol* | *Geographic* | | *Geomagnetic* | |
|---|---|---|---|---|---|
| | | *Lat. (°N)* | *Long. (°E)* | *Lat. (°N)* | *Long. (°E)* |
| TENERIFE | SZT | 28.48 | 343.72 | 34.60 | 60.30 |
| SAN JUAN | SJG | 18.38 | 293.88 | 29.36 | 5.21 |
| APIA | API | -13.80 | 188.22 | -15.61 | 261.99 |
| KANOYA | KNY | 31.42 | 130.88 | 21.12 | 199.85 |
| HYDERABAD | HYB | 17.42 | 78.55 | 7.86 | 150.69 |

In the list of storm sudden commencements (section 5.1., pages 139-140) the following indications are given for each event :

a) Day, hour and minute (mean value taken from the monthly reports); first and last minutes thus reported are given in brackets at the end of the line.

b) The five number codes (one for each collaborating observatory) ; if some figures are underlined, it means that the replacement observatory was used.

c) The mean average duration, in minutes, of the event and its average amplitude, in nT.

d) The following figures indicate the number of observatories that in the monthly reports have characterized the ssc by each of the three letters A, B, or C, their meaning being :

A = very remarkable
B = fair, ordinary but unmistakable
C = very poor, doubtful.

Please note that the 0 to 3 qualification is given by the Service on Rapid Variations, independently from these A, B, C, qualifications which are given by the observatories, although some sort of correlation must exist among them.

The last group indicates the number of observatories that have classified the event other than an ssc, namely :

si = sudden impulse, but not an ssc,
sfe = solar flare effect
b = bay-like disturbance.

### 1.5.2 Solar flare effects (sfe).

The aim of the Service is to provide a reliable list of times when a magnetic solar flare effect did occur. Unfortunately, the reports on solar flare effects are not provided by all the observatories sending regularly the monthly reports on Rapid Magnetic Variations to the Service. As the sfe is a phenomenon dependent of longitude, it is not an easy task to provide a complete round the world coverage.

*Step 1.* The list of all times given in the monthly reports from observatories as possible occurrences of sfe's are checked with data taken mainly from Solar Geophysical Data, on the occurrence of alpha-flares, radio bursts or SID's, as, by definition, the crochet-like disturbance in the magnetograms must be an effect from solar activity and more precisely of a light emission from the Sun.

Times that are not correlated with any of these solar or ionospheric phenomena are eliminated from the list except in the cases when they were reported by more than one observatory or when a single observatory gave the time with the indication that it was confirmed. These exceptions try to take into account the fact that the correlation between solar events and magnetic crochets is not hundred percent.

*Step 2.* The list prepared in such a way is sent to all magnetic observatories, as a *checking list*, and they are asked to inspect their magnetograms and provide their judgement in two steps :

*First :* Do the magnetic records show a movement at the time given?

The answer is given by the following letters :

A = very clear movement
B = fair, ordinary movement
C = very poor movement
D = movement not observed, although records are satisfactory
E = movement cannot be observed due to heavy disturbance
X = record missing

Please note that this letter index refers only to the existence of a movement in the curves and not to the opinion of this movement being or not being a sfe.

*Second* : The opinion of this movement being or not a sfe is given after letters A, B, and possibly C, by a number index :

3 certainly a sfe
2 probably a sfe
1 probably not a sfe
0 certainly not a sfe

The answers from observatories are plotted into world maps for each event ; in these maps are also drawn times showing the sunlit hemisphere and the twilight zones.

*Step 3*. From these maps a judgement is made about the event being or not a sfe. A simultaneous judgment is done about the existence or not of a solar, ionospheric and radio-sun event that could be the cause of the magnetic disturbance. And finally each event is classified as a sfe, a doubtful sfe or a rejected sfe.

Tables for solar flare effects and for doubtful solar flare effects are given in Sections 5.2. to 5.5. of the present Bulletin for the years 1982, 1983, 1984, and 1987 ( pages 141-1xx). The format is the following :

a) A summary list gives for each month, the day and time of the beginning of sfe; if the sfe is confirmed the letter C follows the time of the event. Then are indicated the number of observatories having reported a movement (letters A, B, C, see explanation in *Step 2* above), and the number of observatories having not reported any movement (letters D, E, X, see *Step 2* above).

b) It is followed by detailed tables giving for each event the list of observatories reporting it with the number-index, arranged according to the classifying letter and to longitude.

Stations in the twilight zone, reporting a movement (A, B, C and also E and X) are indicated by normal brackets; those in the night-side of the earth by square brackets. Station in these two zones reporting D have been omitted from the lists

The separation into such two tables of sfe and "doubtful" sfe may be rather subjective, due to the fact that we do not really know the mechanism linking the radiation emission from a flare and its effect on the magnetic records.

For instance, if we accept that the link is an ionising radiation from a solar flare producing an electric current in some region of the sunlit ionosphere, can this current extend its effect into the night hemisphere of the earth? And can all flares, observed in the alpha-light, produce such ionisation ? We are aware, from observations of solar flux, that not all frequencies produce similar magnetic effects. Satellite observations of X-ray flares may help in solving these and similar questions, but until now we have a fairly good coverage of alpha-flares and a rather limited of X-flares. Moreover it must be taken into account that not all flares have the same emission of energy and that their effects on the earth therefore may be limited to a smaller, or to a larger region of the earth.

Following the same kind of reasoning, we may find different effects due to the geometric relative position of the angle of emission in the Sun and the angle of reception at the earth.

For all these reasons, the tables of solar-flare-effects do not appear to be directly usable for detailed statistical studies, but they may be a good indication for researchers, where to look in the magnetic records when they study some particular event.

## SECTION 2

# LIST OF OBSERVATORIES

## LIST OF OBSERVATORIES

| IAGA Code | Name | Geographic | | Geomagnetic | | Alt. (m) | K=9 lower limit | Open -Closed |
|---|---|---|---|---|---|---|---|---|
| | | Lat. | Long. | Lat. | Long. | | | |
| ABN | ABINGER | 51.18 | 359.61 | 53.58 | 84.55 | 244 | 520 | 1925-1957 |
| ABK | ABISKO | 68.36 | 18.82 | 65.88 | 115.50 | 380 | | 1945 |
| AAE | ADDIS ABABA | 9.03 | 38.77 | 5.19 | 110.97 | 2442 | | 1958 |
| ADE | ADELAIDE | -34.60 | 138.40 | -43.99 | 214.06 | | | 1973 |
| AGN | AGINCOURT | 43.78 | 280.73 | 54.65 | 349.54 | 175 | 700 | 1881-1969 |
| AHM | AHMEDABAD | 23.02 | 72.60 | 14.03 | 145.65 | | | 1973 |
| ALE | ALERT | 82.50 | 297.50 | 86.24 | 163.08 | 2260 | | 1961 |
| ABG | ALIBAG | 18.63 | 72.87 | 9.64 | 145.39 | 10 | | 1904 |
| AAA | ALMA ATA | 43.25 | 76.92 | 33.69 | 152.21 | 1300 | | 1963 |
| ALM | ALMERIA | 36.85 | 357.53 | 40.16 | 76.83 | 65 | | 1955 |
| ALU | ALOUSHTA | 44.68 | 34.42 | 40.86 | 114.94 | | | 1957 |
| AML | AMBERLEY | -43.15 | 172.72 | -47.16 | 254.00 | 40 | 530 | 1929-1977 |
| AWS | ANDREWS AFB | 38.20 | 282.63 | 49.13 | 352.23 | | | 1972 |
| ANN | ANNAMALAINAGAR | 11.40 | 79.68 | 1.77 | 151.20 | 0 | | 1957 |
| TAN | ANTANANARIVO | -18.92 | 47.55 | -23.85 | 114.58 | 1375 | | 1902 |
| ANO | ANTIPOLO | 14.60 | 121.17 | 3.50 | 191.60 | 220 | | 1910-1938 |
| APA | APATITY | 67.55 | 33.33 | 62.78 | 125.99 | | | 1973 |
| API | APIA | -13.80 | 188.22 | -15.61 | 261.99 | 2 | | 1905 |
| ART | ARCTOWSKI | -62.16 | 301.52 | -51.33 | 9.25 | 16 | | 1978 |
| ARE | AREQUIPA | -16.47 | 288.52 | -5.45 | 359.45 | | | 1958 |
| AIA | ARGENTINE ISLAND | -65.20 | 295.70 | -54.23 | 4.73 | 10 | 490 | 1957 |
| SV3 | ARTI | 56.43 | 58.43 | 48.50 | 139.90 | | | 1973 |
| ASH | ASHKHABAD | 37.95 | 58.10 | 30.58 | 134.62 | 300 | | 1958 |
| ASO | ASO | 32.88 | 131.02 | 22.58 | 199.85 | 570 | | 1940 |
| PEG | ATHENS | 37.97 | 23.72 | 32.60 | 121.60 | 110 | | 1900-1908 |
| AUT | AU-TAU | 22.45 | 114.05 | 11.20 | 184.60 | 60 | | 1928-1939 |
| AVE | AVERROES | 37.99 | 14.02 | 38.13 | 93.59 | 230 | | 1970 |
| BKC | BACK | 57.69 | 265.77 | 67.43 | 326.54 | | | 1978 |
| BAG | BAGUIO | 16.42 | 120.60 | 5.61 | 191.08 | 440 | | 1967 |
| BAL | BALDWIN | 38.78 | 264.83 | 48.90 | 330.60 | 340 | | 1901-1909 |
| BLC | BAKER LAKE | 64.33 | 263.97 | 73.67 | 319.15 | 30 | | 1951 |
| BNG | BANGUI | 4.43 | 18.57 | 4.45 | 90.33 | 390 | | 1952 |
| BAP | BARRACKPORE | 22.78 | 88.36 | 12.20 | 160.30 | 10 | | 1904-1914 |
| BRW | BARROW | 71.30 | 203.25 | 69.10 | 243.67 | 7 | | 1949 |
| BTH | BARTH | 54.37 | 12.75 | 55.00 | 99.90 | 20 | | 1898-1903 |
| BTV | BATAVIA | -6.18 | 106.83 | -17.19 | 177.64 | 10 | | 1884-1944 |
| BJI | BEI-JING | 40.06 | 116.18 | 29.12 | 186.20 | 43 | | 1957 |
| KGD | BEREZNIAKI | 49.82 | 73.08 | 40.30 | 150.00 | | | 1965 |
| BEL | BELSK | 51.83 | 20.80 | 50.19 | 105.24 | 180 | | 1960 |
| BIN | BINZA | -4.38 | 15.26 | -3.57 | 85.40 | 300 | | 1953 |
| BJN | BJORNOYA | 74.50 | 19.20 | 71.06 | 124.67 | 80 | | 1951 |
| BOC | BOCHUM | 51.49 | 7.23 | 52.42 | 92.24 | 120 | | 1893-1912 |
| BGA | BORGA | -72.97 | 356.20 | -66.46 | 42.49 | | | 1975 |
| BOX | BOROK | 58.03 | 38.97 | 52.97 | 324.23 | | | 1977 |
| BOU | BOULDER | 40.13 | 254.77 | 48.88 | 319.04 | 1675 | | 1964 |
| BZR | BOUZAREAH | 36.80 | 3.02 | 39.20 | 82.40 | 340 | | 1912-1920 |

## LIST OF OBSERVATORIES (continued)

| IAGA Code | Name | Geographic | | Geomagnetic | | Alt. (m) | K=9 lower limit | Open -Closed |
|---|---|---|---|---|---|---|---|---|
| | | Lat. | Long. | Lat. | Long. | | | |
| BJE | BRORFELDE | 55.63 | 11.67 | 55.80 | 97.60 | 80 | 600 | 1978 |
| BVZ | BUDAKESZI | 47.52 | 18.90 | 46.40 | 101.80 | 410 | | 1949-1955 |
| BDV | BUDKOV | 49.07 | 14.02 | 48.82 | 97.64 | 496 | | 1967 |
| BY1 | BYRD STATION 1 | -79.98 | 240.00 | -70.60 | 336.60 | 1515 | | 1957-1961 |
| BY2 | BYRD STATION 2 | -80.01 | 240.51 | -70.60 | 336.90 | 1515 | | 1962-1965 |
| CBB | CAMBRIDGE BAY | 69.10 | 255.00 | 76.77 | 299.13 | 17 | | 1972 |
| CAN | CANBERRA | -35.30 | 149.00 | -43.38 | 226.09 | 850 | 420 | 1980 |
| CCS | CAPE CHELYUSKIN | 77.72 | 104.28 | 66.72 | 177.41 | 10 | | 1935 |
| CGH | CAPE OF GOOD HOPE | -33.93 | 18.48 | -33.10 | 81.80 | | | 1842-1846 |
| CTO | CAPE TOWN | -33.95 | 18.47 | -33.12 | 82.06 | 20 | | 1932-1940 |
| CWE | CAPE WELLEN | 66.17 | 190.17 | 62.36 | 239.37 | 10 | | 1933 |
| CY. | CAPO DI MONTE | 40.86 | 14.26 | 40.90 | 94.80 | 160 | | 1883-1911 |
| CPI | CAPRI | 40.55 | 14.22 | 40.58 | 94.60 | | | 1957 |
| CAO | CASTELLACCIO | 44.43 | 8.93 | 45.34 | 90.82 | 1175 | | 1933 |
| CRC | CASTLE ROCK | 37.23 | 237.87 | 43.56 | 301.06 | 460 | | 1970 |
| HVN | CENTRO GEOFISICO | 22.97 | 277.86 | 34.00 | 347.40 | | | 1965 |
| CPA | CHA-PA | 22.35 | 103.83 | 11.38 | 175.03 | 1550 | | 1957 |
| CLF | CHAMBON LA FORET | 48.02 | 2.27 | 50.06 | 85.71 | | | 1936 |
| CLH | CHELTENHAM | 38.70 | 283.20 | 49.65 | 352.89 | 72 | 530 | 1901-1956 |
| CBI | CHICHIJIMA | 27.15 | 142.30 | 17.80 | 210.78 | 154 | | 197 |
| CHR | CHRISTCHURCH | 43.54 | 172.62 | 47.60 | 254.3 | 10 | | 1902-1928 |
| COI | COIMBRA | 40.22 | 351.58 | 44.53 | 71.78 | 140 | | 1866 |
| BOM | COLABA | 18.90 | 72.82 | 9.70 | 145.30 | 10 | | 1846-1905 |
| CMO | COLLEGE 2 | 64.87 | 212.17 | 65.10 | 259.23 | 200 | | 1948 |
| CLL | COLLMBERG | 51.32 | 13.00 | 51.16 | 97.70 | | | 1935 |
| CSS | COLORADO SPRINGS | 38.50 | 255.51 | 47.36 | 320.27 | | | 1973 |
| COP | COPENHAGEN | 55.69 | 12.58 | 55.39 | 99.64 | | | 1892-1900 |
| CZT | CROZET | -46.43 | 51.87 | -51.49 | 111.46 | 160 | 500 | 1974 |
| DAL | DALLAS | 32.98 | 263.25 | 42.73 | 330.14 | 210 | | 1964-1974 |
| DRS | DAR ES SALAAM | -6.51 | 39.18 | -10.17 | 108.56 | | | 1896-1900 |
| DAV | DAVAO | 7.08 | 125.58 | -3.49 | 196.39 | | | 1968 |
| DVS | DAVIS | -68.60 | 78.00 | -76.81 | 124.34 | | | 1973 |
| DBN | DE BILT | 52.10 | 5.18 | 53.40 | 90.56 | | | 1899-1938 |
| DDI | DEHRA DUN | 30.32 | 78.06 | 20.50 | 151.60 | 680 | | 1903-1943 |
| DIK | DIXON | 73.55 | 80.57 | 63.36 | 162.45 | 20 | | 1933 |
| DOB | DOMBAS | 62.07 | 9.12 | 61.97 | 100.94 | 660 | | 1916 |
| DOU | DOURBES | 50.10 | 4.60 | 51.60 | 88.99 | 208 | | 1955 |
| DL | DUBLIN | 53.35 | 353.73 | 56.90 | 80.00 | | | 1841-1850 |
| DRV | DUMONT DURVILLE | -66.66 | 140.01 | -75.06 | 232.15 | 40 | | 1957 |
| TFS | DUSHETI | 42.08 | 44.70 | 36.50 | 23.50 | 982 | | 1938 |
| KIV | DYMER | 50.72 | 30.30 | 47.30 | 113.60 | 100 | | 1964 |
| EAA | EAST ANGLIA | 52.63 | 1.30 | 54.64 | 87.01 | | | 1973 |
| EIC | EASTER ISLAND | -27.17 | 250.58 | -18.37 | 324.28 | | | 1959-1963 |
| EP. | EASTPORT | 44.90 | 293.02 | 56.20 | 4.80 | | | 1860-1867 |
| EBR | EBRO | 40.82 | 0.50 | 43.45 | 81.13 | 50 | | 1910 |
| ENB | EIELSON AFB | 64.67 | 212.92 | 65.06 | 260.11 | | | 1966 |

## LIST OF OBSERVATORIES (continued)

| IAGA Code | Name | Geographic | | Geomagnetic | | Alt. (m) | K=9 lower limit | Open -Closed |
|---|---|---|---|---|---|---|---|---|
| | | Lat. | Long. | Lat. | Long. | | | |
| ELI | ELIZABETHVILLE | -11.63 | 27.42 | -13.00 | 95.93 | 1230 | | 1932-1957 |
| ESK | ESKDALEMUIR | 55.32 | 356.80 | 58.04 | 84.07 | 245 | 660 | 1908 |
| EKP | ESKIMO POINT | 61.10 | 265.93 | 70.78 | 324.73 | | | 1973 |
| EYR | EYREWELL | -43.41 | 172.35 | -47.48 | 253.71 | 390 | 540 | 1979 |
| FAL | FALMOUTH | 50.15 | 354.92 | 53.60 | 79.40 | 50 | | 1892-1912 |
| FCC | FORT CHURCHILL 1 | 58.80 | 265.90 | 68.53 | 325.60 | 15 | | 1964 |
| FCC | FORT CHURCHILL 2 | 58.77 | 265.73 | 68.70 | 325.20 | 15 | | 1964 |
| FMM | FORT MCMURRAY | 56.70 | 248.60 | 64.18 | 305.05 | | | 1973 |
| FSV | FORT SEVERN | 55.98 | 272.35 | 66.34 | 336.32 | | | 1977 |
| FSM | FORT SMITH | 58.00 | 246.00 | 65.01 | 301.02 | | | 1973 |
| FYU | FORT YUKON | 66.57 | 214.70 | 67.08 | 259.59 | | | 1957 |
| FRD | FREDERICKSBURG | 38.20 | 282.63 | 49.13 | 352.23 | 69 | 520 | 1956 |
| FTN | FREETOWN | 8.46 | 346.79 | 14.21 | 59.59 | | | 1961-1967 |
| FUQ | FUQUENE | 5.47 | 286.27 | 16.47 | 357.07 | 2543 | | 1954 |
| FUR | FURSTENFELDBRUCK | 48.17 | 11.28 | 48.48 | 94.62 | 572 | | 1939 |
| GEN | GENOVA MC | 44.55 | 8.96 | 45.50 | 91.00 | 700 | | 1958-1962 |
| GEN | GENOVA C | 44.43 | 8.93 | 45.50 | 91.00 | 350 | | 1933-1969 |
| GIT | GILGIT | 35.93 | 74.30 | 26.67 | 148.86 | 1494 | | 1967 |
| GIM | GILLAM | 56.40 | 265.30 | 66.11 | 326.54 | | | 1975 |
| GIR | GIRARDVILLE | 49.00 | 287.40 | 60.01 | 357.77 | | | 1973 |
| GNA | GNANGARA | -31.78 | 115.95 | -42.71 | 187.94 | 60 | 440 | 1959 |
| GDH | GODHAVN | 69.23 | 306.48 | 79.25 | 34.62 | 8 | | 1926 |
| GOT | GOTTINGEN | 51.55 | 9.97 | 51.97 | 95.00 | 270 | | 1957 |
| GVD | GONZALES VIDELA | -64.82 | 297.15 | -53.88 | 5.80 | 60 | | 1961 |
| VLA | GORNOTAYEZHNAYA | 43.68 | 132.17 | 30.10 | 199.60 | 200 | | 1958 |
| GRM | GRAHAMSTOWN | -33.28 | 26.48 | -34.01 | 90.04 | 650 | | 1974 |
| GWC | GREAT WHALE RIVER | 55.30 | 282.25 | 66.21 | 350.32 | 25 | | 1965 |
| GRW | GREENWICH | 51.48 | 0.00 | 53.79 | 85.10 | 50 | | 1846-1925 |
| GCK | GROCKA | 44.63 | 20.77 | 43.28 | 102.27 | 231 | | 1958 |
| GUA | GUAM | 13.58 | 144.87 | 4.57 | 214.76 | 150 | | 1957 |
| HLL | HALLET | -72.32 | 170.22 | -74.42 | 278.16 | | | 1957-1963 |
| HBA | HALLEY BAY | -75.50 | 333.40 | -66.36 | 25.85 | 30 | | 1957 |
| HBK | HARTEBEESTHOEK | -25.88 | 27.71 | -27.01 | 93.14 | | | 1980 |
| HAD | HARTLAND | 50.98 | 355.52 | 54.17 | 80.29 | 95 | 530 | 1957 |
| HTY | HATIZYO | 33.07 | 139.83 | 23.45 | 207.83 | | | 1978 |
| HVN | HAVANA | 22.97 | 277.85 | 33.75 | 347.53 | | | 1964 |
| HII | HEARD ISLAND | -53.03 | 73.37 | -61.50 | 132.30 | 10 | | 1950-1954 |
| HIS | HEISS ISLAND | 80.62 | 58.05 | 71.60 | 156.33 | 20 | | 1959 |
| HLP | HEL | 54.60 | 18.82 | 53.19 | 104.80 | 4 | | 1957 |
| HLW | HELWAN | 29.87 | 31.33 | 26.98 | 108.01 | 120 | | 1903-1959 |
| HCR | HERCHMER | 57.40 | 265.90 | 67.16 | 326.86 | | | 1973 |
| HER | HERMANUS | -34.42 | 19.23 | -33.73 | 82.67 | 26 | 300 | 1941 |
| HNA | HOLLANDIA | -2.57 | 140.52 | -11.94 | 212.17 | 98 | | 1957-1962 |
| HKC | HONG KONG 1 | 22.30 | 114.18 | 11.00 | 184.70 | 30 | | 1884-1928 |
| HKC | HONG KONG 2 | 22.20 | 114.20 | 11.22 | 184.82 | 555 | | 1972 |
| HON | HONOLULU 1-2-3 | 21.32 | 202.00 | 21.46 | 268.57 | 4 | | 1902 |

## LIST OF OBSERVATORIES (continued)

| IAGA Code | Name | Geographic | | Geomagnetic | | Alt. (m) | K=9 lower limit | Open -Closed |
|---|---|---|---|---|---|---|---|---|
| | | Lat. | Long. | Lat. | Long. | | | |
| HUA | HUANCAYO | -12.05 | 284.67 | -1.06 | 355.67 | 3313 | | 1922 |
| HRB | HURBANOVO | 47.87 | 18.18 | 46.89 | 101.07 | 120 | | 1938 |
| HYB | HYDERABAD | 17.42 | 78.55 | 7.86 | 150.69 | 500 | | 1965 |
| IBD | IBADAN | 7.43 | 3.90 | 10.17 | 76.46 | 300 | | 1956 |
| IRT | IRKUTSK | 52.17 | 104.45 | 41.18 | 176.22 | 470 | | 1887-1914 |
| ISL | ISLAND LAKE | 53.90 | 265.30 | 63.65 | 327.61 | | | 1976 |
| ISK | ISTANBUL KANDILLY | 41.07 | 29.07 | 38.31 | 108.87 | 130 | | 1947 |
| JSS | JASSY | 47.18 | 27.53 | 44.40 | 109.60 | | | 1935-1957 |
| KAK | KAKIOKA | 36.23 | 140.18 | 26.62 | 207.77 | 28 | | 1913 |
| KNG | KALININGRAD | 54.60 | 20.20 | 52.94 | 106.06 | | | 1964 |
| KNY | KANOYA | 31.42 | 130.88 | 21.12 | 199.85 | 105 | | 1957 |
| KNZ | KANOZAN | 35.25 | 139.97 | 25.63 | 207.70 | 342 | | 1961 |
| KGD | KARAGANDA | 49.82 | 73.08 | 40.56 | 150.04 | | | 1966 |
| TFS | KARSANI | 41.83 | 42.70 | 36.20 | 123.50 | 1100 | | 1905-1934 |
| KZN | KAZAN | 55.83 | 48.85 | 49.36 | 131.52 | 80 | | 1909 |
| KEL | KELES | 41.42 | 69.20 | 32.40 | 145.20 | 450 | | 1936-1963 |
| KEM | KEM | 65.00 | 34.40 | 60.26 | 124.74 | | | 1973 |
| KEW | KEW | 51.47 | 359.68 | 54.10 | 85.10 | 10 | | 1857-1924 |
| KHB | KHABAROVSK | 48.48 | 135.07 | 38.39 | 201.74 | | | 1972 |
| KIV | KIEV | 50.72 | 30.30 | 47.42 | 113.40 | 100 | | 1963 |
| KIR | KIRUNA | 67.83 | 20.42 | 65.14 | 116.19 | 390 | | 1950 |
| KLY | KLYUCHI | 55.03 | 82.90 | 44.70 | 159.00 | | | 1967 |
| KOD | KODAIKANAL | 10.23 | 77.47 | 0.81 | 148.93 | 2323 | | 1902 |
| KTS | KORETS | 50.60 | 61.07 | 42.64 | 140.10 | | | 1968 |
| KOR | KOROR | 7.33 | 134.50 | -2.64 | 205.21 | 10 | | 1957-1966 |
| MOS | KRASNAYA | 55.47 | 37.32 | 50.70 | 121.70 | 190 | | 1930 |
| KSA | KSARA | 33.82 | 35.88 | 30.03 | 113.26 | 920 | | 1937-1968 |
| KUY | KUYPER | -6.03 | 106.73 | -17.04 | 177.54 | 1 | | 1950-1962 |
| KWJ | KWAJALEIN | 9.05 | 167.20 | 3.13 | 237.11 | | | 1973 |
| AQU | L'AQUILA | 42.38 | 13.32 | 42.52 | 94.35 | 682 | | 1960 |
| LQA | LA QUIACA | -22.10 | 294.40 | -11.13 | 5.01 | 3464 | | 1920 |
| LAS | LAS ACACIAS | -35.00 | 302.32 | -24.24 | 11.86 | 20 | | 1964 |
| LDR | LAUDER | -43.03 | 169.41 | -37.70 | 232.10 | 370 | | 1977 |
| LRV | LEIRVOGUR | 64.18 | 338.30 | 69.71 | 71.98 | 30 | | 1957 |
| LNN | LENINGRAD | 59.95 | 30.70 | 56.14 | 118.32 | 70 | | 1869-1877 |
| LER | LERWICK | 60.13 | 358.82 | 62.15 | 89.55 | 105 | 920 | 1923 |
| LIS | LISBON | 38.72 | 350.85 | 43.30 | 70.60 | | | 1890-1900 |
| LGR | LOGRONO | 42.45 | 357.50 | 45.59 | 78.66 | 445 | | 1957 |
| MMK | LOPARSKAYA | 68.25 | 33.08 | 63.30 | 126.70 | 200 | | 1961 |
| LOB | LORING AFB | 46.95 | 292.12 | 57.95 | 3.89 | | | 1966 |
| LA. | LOS ANGELES | 34.05 | 241.74 | 41.20 | 305.70 | | | 1882-1889 |
| LMM | LOURENCO MARQUES | -25.92 | 32.58 | -27.98 | 97.96 | 40 | | 1957 |
| LOV | LOVO | 59.35 | 17.83 | 57.84 | 106.75 | 25 | 720 | 1928 |
| LOZ | LOVOZERO | 67.97 | 35.02 | 62.90 | 127.64 | | | 1957 |
| LUA | LUANDA | -8.92 | 13.17 | -7.63 | 82.48 | 53 | | 1956 |
| LB | LUBECK | 53.86 | 10.69 | 54.00 | 97.00 | | | 1885-1893 |

## LIST OF OBSERVATORIES (continued)

| IAGA Code | Name | Geographic | | Geomagnetic | | Alt. (m) | K=9 lower limit | Open -Closed |
|---|---|---|---|---|---|---|---|---|
| | | Lat. | Long. | Lat. | Long. | | | |
| LUK | LUKIAPANG | 31.32 | 121.03 | 20.20 | 190.80 | 100 | | 1908-1933 |
| LNP | LUNPING | 25.00 | 121.17 | 14.21 | 191.28 | 100 | | 1965 |
| LVV | LVOV | 49.90 | 23.75 | 47.80 | 107.10 | 400 | | 1952 |
| LWI | LWIRO | -2.25 | 28.80 | -4.06 | 99.10 | 1680 | | 1958-1970 |
| MBO | MBOUR | 14.40 | 343.02 | 20.68 | 56.80 | 10 | | 1952 |
| MCQ | MACQUARIE ISLAND | -54.50 | 158.95 | -60.54 | 244.48 | 4 | | 1951 |
| MGD | MAGADAN | 60.12 | 151.02 | 51.28 | 212.15 | | 610 | 1966 |
| MSC | MAISACH | 48.20 | 11.26 | 48.50 | 94.90 | 480 | | 1927-1932 |
| MQ | MAKERSTOUN | 55.58 | 357.48 | 52.20 | 85.30 | | | 1841-1849 |
| MAB | MANHAY | 50.30 | 5.68 | 51.60 | 90.15 | 440 | | 1936-1971 |
| MAN | MANILA | 14.58 | 120.98 | 3.50 | 191.40 | | | 1891-1904 |
| MRN | MARION ISLAND | -46.85 | 37.87 | -49.30 | 96.75 | 45 | | 1972 |
| AMS | MARTIN DE VIVIES | -37.98 | 77.57 | -46.94 | 142.78 | 50 | 460 | 1981 |
| MSR | MATOCHKIN SHAR | 73.26 | 56.40 | 64.80 | 147.40 | 250 | | 1937-1944 |
| MRI | MAURITIUS | -20.09 | 57.55 | -26.80 | 124.40 | 50 | | 1892-1965 |
| MAW | MAWSON | -67.60 | 62.88 | -73.32 | 106.62 | 6 | | 1955 |
| MEA | MEANOOK | 54.62 | 246.67 | 61.88 | 304.02 | 686 | 1360 | 1916 |
| MEL | MELBOURNE | -37.83 | 144.98 | 46.60 | 222.30 | 30 | | 1865-1921 |
| MEV | MELVILLE AFB | 53.28 | 299.47 | 64.05 | 14.25 | | | 1966 |
| MMB | MEMAMBETSU | 43.90 | 144.20 | 34.61 | 210.23 | 39 | 340 | 1950 |
| MNK | MINSK | 54.10 | 26.52 | 51.32 | 111.51 | | | 1961 |
| MIR | MIRNY | -66.55 | 93.02 | -76.80 | 151.15 | 20 | | 1956 |
| MLT | MISALLAT | 29.52 | 30.90 | 26.72 | 107.52 | 120 | | 1960 |
| MIU | MIYAZU | 35.32 | 135.11 | 25.30 | 203.32 | | | 1973 |
| MIZ | MIZUSAWA | 39.01 | 141.08 | 29.47 | 208.21 | | | 1969 |
| MFP | MOCA | 3.35 | 8.67 | 5.27 | 80.39 | 1949 | | 1958-1971 |
| MOL | MOLODEZHNAYA | 67.67 | 45.85 | 70.10 | 87.50 | 854 | | 1965 |
| MOS | MOSCOW | 55.48 | 37.32 | 50.79 | 121.62 | 190 | | 1880-1888 |
| MBC | MOULD BAY | 76.30 | 240.60 | 79.62 | 259.89 | 150 | | 1962 |
| MWC | MT WILSON | 34.14 | 241.97 | 41.19 | 306.30 | | | 1926-1958 |
| MNH | MUNCHEN | 48.15 | 11.61 | 48.40 | 95.20 | 530 | | 1842-1926 |
| MUT | MUNTINLUPA | 14.37 | 121.02 | 3.58 | 191.57 | 62 | | 1951 |
| MMK | MURMANSK | 68.25 | 33.08 | 63.45 | 126.43 | 210 | | 1958-1960 |
| NCK | NAGYCENK | 47.63 | 16.72 | 46.93 | 99.59 | 160 | | 1961 |
| NAI | NAIROBI | -1.28 | 36.83 | -4.60 | 107.19 | 1673 | | 1964 |
| NTS | NANTES | 47.25 | 358.44 | 50.10 | 81.70 | 35 | | 1923-1958 |
| NAQ | NARSSARSSUAQ | 61.20 | 314.6O | 70.60 | 38.66 | 4 | | 1973 |
| NL | NEW ALESUND | 78.92 | 11.93 | 75.43 | 130.70 | 12 | | 1966 |
| NEW | NEWPORT | 48.27 | 242.88 | 55.14 | 302.78 | 780 | 700 | 1966 |
| NYI | NEW YEAR ISLAND | 54.65 | 295.85 | 43.30 | 5.20 | | | 1902-1916 |
| NCE | NICE | 43.72 | 7.30 | 45.00 | 89.00 | | | 1889-1901 |
| NGK | NIEMEGK | 52.07 | 12.68 | 51.94 | 97.77 | 78 | 500 | 1932 |
| NSM | NITSANIM | 31.73 | 34.60 | 28.21 | 111.55 | 150 | | 1963-1967 |
| NOK | NORILSK | 69.20 | 88.00 | 58.68 | 165.77 | | | 1969 |
| NKK | NOVOKAZALINSK | 45.77 | 62.12 | 37.76 | 139.83 | | | 1974 |
| NVL | NOVOLAZAREVSKAYA | -70.77 | 11.82 | -66.76 | 55.88 | 460 | | 1961 |

## LIST OF OBSERVATORIES (continued)

| IAGA Code | Name | Geographic | | Geomagnetic | | Alt. (m) | K=9 lower limit | Open -Closed |
|---|---|---|---|---|---|---|---|---|
| | | Lat. | Long. | Lat. | Long. | | | |
| NVS | NOVOSIBIRSK | 55.03 | 82.90 | 44.92 | 159.07 | | 480 | 1967 |
| NUR | NURMIJARVI | 60.52 | 24.65 | 57.71 | 113.51 | 105 | | 1953 |
| ODE | ODESSA | 46.78 | 30.88 | 43.52 | 112.42 | 50 | | 1896-1925 |
| OGY | O'GYALIA | 47.88 | 18.19 | 46.80 | 101.30 | 110 | | 1906-1912 |
| OKN | OKINAWA | 24.75 | 125.33 | 14.14 | 195.18 | | | 1977 |
| ORC | ORCADAS DEL SUR | -60.74 | 315.22 | -50.30 | 20.00 | 4 | | 1931-1962 |
| OSL | OSLO | 59.98 | 10.72 | 59.60 | 101.10 | | | 1843-1930 |
| OTT | OTTAWA | 45.40 | 284.45 | 56.37 | 354.11 | 75 | 790 | 1968 |
| PAG | PANAGYURISHTE | 42.52 | 24.18 | 40.61 | 104.75 | 556 | | 1948 |
| PPT | PAPEETE | -17.55 | 210.38 | -15.09 | 284.44 | | | 1958 |
| PAB | PARAMARIBO | 5.82 | 304.78 | 16.41 | 16.28 | 2 | | 1957 |
| PET | PETROPAVLOSK | 53.10 | 158.63 | 44.80 | 220.00 | 110 | 450 | 1973 |
| IRK | PATRONY | 52.17 | 104.45 | 40.90 | 176.10 | 500 | | 1959 |
| PEB | PELLY BAY | 68.50 | 270.20 | 78.39 | 323.86 | | | 1977 |
| PEK | PEKING 1 | 39.95 | 116.47 | 28.70 | 186.30 | | | 1870-1883 |
| PEK | PEKING 2 | 40.04 | 116.18 | 28.80 | 186.10 | | | 1957-1964 |
| PEG | PENDELI | 38.03 | 23.52 | 36.38 | 102.73 | 495 | | 1958 |
| PRF | PERPIGNAN | 42.70 | 2.88 | 44.90 | 84.30 | 30 | | 1890-1900 |
| PIL | PILAR | -31.67 | 296.12 | -20.73 | 6.39 | 336 | | 1905 |
| PLS | PLAISANCE | -20.43 | 57.67 | -27.02 | 124.68 | 123 | | 1966 |
| PZ | PLESHCHENITZI | 54.50 | 27.88 | 51.40 | 113.10 | 200 | | 1961 |
| POD | PODKAMENAYA TUNG | 61.40 | 90.00 | 50.84 | 165.64 | | 670 | 1968 |
| POL | POLA | 44.86 | 13.26 | 44.80 | 95.90 | 30 | | 1883-1922 |
| PAF | PORT AUX FRANCAIS | -49.35 | 70.22 | -57.31 | 130.79 | 35 | 750 | 1957 |
| PMG | PORT MORESBY | -9.40 | 147.15 | -17.99 | 219.75 | 80 | | 1957 |
| PBQ | POSTE DE LA BALEINE | 55.30 | 287.25 | 66.31 | 357.38 | | | 1984 |
| POT | POSTDAM | 52.38 | 13.06 | 52.16 | 98.28 | 80 | | 1890-1907 |
| PRU | PRUHONICE | 49.98 | 14.55 | 49.59 | 98.55 | 329 | | 1946 |
| QUE | QUETTA | 30.18 | 66.95 | 21.77 | 141.35 | 1737 | | 1953 |
| RIT | RANKIN INLET | 62.80 | 267.90 | 72.64 | 326.36 | | | 1975 |
| REG | REGENSBERG | 47.48 | 8.44 | 48.40 | 91.70 | 605 | | 1957-1969 |
| RES | RESOLUTE BAY | 74.70 | 265.10 | 83.14 | 295.98 | 25 | | 1954 |
| RDJ | RIO DE JANEIRO | -22.91 | 316.83 | -12.80 | 26.00 | 60 | | 1899-1906 |
| ROB | ROBURENT | 44.30 | 7.88 | 45.41 | 89.74 | 815 | | 1964 |
| RSV | RUDE SKOV | 55.85 | 12.45 | 55.56 | 99.61 | 48 | 600 | 1907-1978 |
| SAB | SABHAWALA | 30.33 | 77.80 | 20.78 | 151.34 | 498 | | 1964 |
| SFS | SAN FERNANDO | 36.47 | 353.80 | 40.47 | 72.90 | 28 | | 1891 |
| SJG | SAN JUAN 1-2-3 | 18.38 | 293.88 | 29.36 | 5.21 | 100 | | 1903 |
| SNA | SANAE | -70.30 | 357.65 | -64.23 | 46.20 | 52 | | 1962 |
| STJ | SAINT JOHNS | 47.59 | 307.32 | 58.20 | 23.30 | | | 1968 |
| PSM | SAINT MAUR | 48.81 | 2.49 | 50.80 | 86.60 | | | 1883-1900 |
| SMG | SAN MIGUEL | 37.77 | 334.35 | 45.04 | 52.61 | 175 | | 1911 |
| SBA | SCOTT BASE | -77.85 | 166.78 | -78.84 | 293.24 | 15 | | 1957 |
| SED | SEDDEN | 52.28 | 13.01 | 52.10 | 98.50 | 40 | | 1908-1931 |
| STF | SDR STROMFJORD | 67.02 | 309.28 | 76.83 | 36.25 | | | 1972 |
| SSH | SHE-SHAN | 31.10 | 121.19 | 20.30 | 191.03 | 100 | | 1934 |

## LIST OF OBSERVATORIES (continued)

| IAGA Code | Name | Geographic | | Geomagnetic | | Alt. (m) | K=9 lower limit | Open -Closed |
|---|---|---|---|---|---|---|---|---|
| | | Lat. | Long. | Lat. | Long. | | | |
| SHB | SHEPERD BAY | 68.75 | 266.25 | 78.14 | 316.78 | | | 1966 |
| SHL | SHILLONG | 25.55 | 91.88 | 14.99 | 163.95 | | | 1975 |
| SSO | SIMOSATO | 33.57 | 135.93 | 23.62 | 204.24 | 59 | | 1954-1978 |
| SIT | SITKA | 57.07 | 224.67 | 60.31 | 278.12 | 22 | 1020 | 1902 |
| SOD | SODANKYLA | 67.37 | 26.63 | 63.68 | 120.64 | 178 | | 1914 |
| SLU | SLUTSK | 59.68 | 30.48 | 55.80 | 118.30 | | | 1878-1941 |
| SGG | SOUTH GEORGIA | -54.28 | 323.52 | -44.82 | 27.73 | | 350 | 1974-1982 |
| SPA | SOUTH POLE | -90.00 | 0.00 | -78.98 | 0.00 | 2820 | | 1959 |
| SRE | SREDNIKAN | 62.43 | 152.32 | 53.67 | 212.35 | 61 | | 1936-1966 |
| MGD | STEKOLNI | 60.12 | 151.02 | 51.00 | 211.80 | | | 1966 |
| ODE | STEPANOVKA | 46.78 | 30.88 | 43.40 | 112.50 | 140 | | 1948 |
| STO | STONYHURST | 53.85 | 357.53 | 56.52 | 83.91 | 116 | | 1865-1967 |
| SUA | SURLARI | 44.68 | 26.25 | 42.32 | 107.42 | 84 | | 1949 |
| SVD | SVERDLOVSK | 56.73 | 61.07 | 48.64 | 141.89 | 290 | 530 | 1887-1931 |
| SWI | SWIDER | 52.12 | 21.25 | 50.38 | 105.79 | 100 | | 1921 |
| SYO | SYOWA BASE | -69.03 | 39.60 | -70.10 | 79.70 | 15 | | 1958-1970 |
| TAM | TAMANRASSET | 22.80 | 5.53 | 24.94 | 81.23 | 1395 | | 1932 |
| TNG | TANGERANG | -6.17 | 106.63 | -17.18 | 177.43 | 14 | | 1964 |
| TKT | TASHKENT | 41.33 | 69.62 | 32.51 | 145.52 | 500 | | 1883 |
| TTB | TATUOCA | -1.20 | 311.48 | 8.98 | 220.50 | 10 | | 1957-1971 |
| TEH | TEHERAN | 35.73 | 51.38 | 29.36 | 128.05 | 1367 | | 1960-1973 |
| SZT | TENERIFE | 28.48 | 343.72 | 34.60 | 60.30 | 310 | | 1959 |
| TEO | TEOLOYUCAN | 19.75 | 260.82 | 29.35 | 329.24 | 2280 | | 1923 |
| TAA | TERRE ADELIE | -66.67 | 140.02 | -75.07 | 232.18 | 40 | | 1957 |
| TMP | THOMPSON | 55.72 | 262.12 | 65.09 | 322.65 | | | 1969 |
| THU | THULE/CAMP TUTO | 76.55 | 291.17 | 87.53 | 11.26 | 480 | | 1932-1952 |
| THL | THULE/QANAQ | 77.48 | 290.83 | 88.46 | 14.10 | 57 | | 1956 |
| TFS | TIFLIS | 42.08 | 44.70 | 36.62 | 123.49 | 982 | | 1879-1905 |
| THY | TIHANY | 46.90 | 17.90 | 46.01 | 100.41 | 187 | | 1949 |
| TKH | TIKHAYA BAY | 80.30 | 52.80 | 71.74 | 153.42 | 10 | | 1932-1958 |
| TIP | TIRUCHIRAPALLI | 10.80 | 78.70 | 1.26 | 150.19 | | | 1975 |
| TIK | TIXIE BAY | 71.58 | 129.00 | 60.99 | 192.81 | 40 | | 1944 |
| KAK | TOKYO | 35.75 | 139.72 | 26.10 | 207.41 | 20 | | 1897-1912 |
| TOL | TOLEDO | 39.88 | 355.95 | 43.39 | 76.18 | 501 | | 1947 |
| TMK | TOMSK | 56.47 | 84.93 | 46.21 | 160.93 | 200 | 510 | 1958-1969 |
| TOO | TOOLANGI | -37.53 | 145.47 | -46.05 | 222.66 | 457 | 510 | 1922-1980 |
| AGN | TORONTO | 43.67 | 280.50 | 54.80 | 349.10 | | | 1872-1898 |
| TLE | TOULOUSE | 43.61 | 1.46 | 46.00 | 83.20 | 190 | | 1894-1905 |
| TGO | TOUNGOO | 18.93 | 96.45 | 7.90 | 167.80 | 300 | | 1905-1923 |
| TOH | TOYOHARANEW | 46.95 | 142.75 | 37.20 | 208.30 | 70 | | 1932-1941 |
| TRW | TRELEW | -43.25 | 294.68 | -32.28 | 4.81 | | 290 | 1957-1970 |
| TRD | TRIVANDRUM | 8.48 | 76.95 | -0.88 | 148.24 | 300 | | 1957 |
| TRO | TROMSO | 69.67 | 18.95 | 67.00 | 117.16 | 105 | | 1930 |
| TSN | TSINGTAO | 36.07 | 120.32 | 25.00 | 189.90 | 80 | | 1924-1936 |
| TSU | TSUMEB | -19.22 | 17.70 | -18.59 | 84.83 | 1300 | | 1964 |
| TUC | TUCSON | 32.25 | 249.17 | 40.37 | 314.57 | 770 | 380 | 1910 |

## LIST OF OBSERVATORIES (continued)

| IAGA Code | Name | Geographic | | Geomagnetic | | Alt. (m) | K=9 lower limit | Open -Closed |
|---|---|---|---|---|---|---|---|---|
| | | Lat. | Long. | Lat. | Long. | | | |
| TUL | TULSA | 35.92 | 264.22 | 45.75 | 330.78 | 257 | | 1961 |
| UCC | UCCLE | 50.80 | 4.36 | 52.30 | 89.40 | 100 | | 1896-1919 |
| UBA | ULAN BATOR | 47.85 | 106.75 | 36.84 | 178.03 | | | 1966 |
| WIT | UTRECHT | 52.00 | 5.12 | 53.40 | 90.80 | | | 1891-1896 |
| VLJ | VAL JOYEUX | 48.82 | 2.02 | 50.87 | 85.83 | | | 1901-1936 |
| VAL | VALENTIA | 51.93 | 349.75 | 56.15 | 74.79 | 14 | | 1899 |
| VSS | VASSOURAS | -22.40 | 316.35 | -12.53 | 25.70 | 457 | | 1915 |
| VIC | VICTORIA | 48.52 | 236.58 | 54.33 | 295.66 | 185 | 660 | 1956 |
| VQS | VIEQUES | 18.15 | 294.55 | 29.11 | 5.93 | | | 1903-1924 |
| VLA | VLADIVOSTOK | 43.12 | 131.90 | 32.84 | 199.68 | | | 1932 |
| LNN | VOEIKOVO | 59.95 | 30.70 | 56.00 | 118.50 | 70 | | 1947 |
| VOR | VOROSHILOV | 43.78 | 132.03 | 33.20 | 199.60 | 30 | | 1952-1957 |
| VOS | VOSTOK | -78.45 | 106.87 | -89.31 | 139.62 | 3500 | | 1958 |
| SVD | VYSOKAYA | 56.73 | 61.07 | 48.40 | 141.90 | 290 | | 1932 |
| WAT | WATHEROO | -30.30 | 115.90 | -41.23 | 187.82 | 240 | | 1919-1958 |
| WES | WESTON | 42.38 | 288.68 | 53.40 | 359.49 | | | 1960 |
| WHS | WHITE SHELL | 49.80 | 264.80 | 59.56 | 328.39 | | | 1975 |
| WIK | WIEN | 48.25 | 16.36 | 47.60 | 69.70 | | | 1892-1898 |
| WIA | WIEN-AUHOF | 48.20 | 16.24 | 47.50 | 69.60 | 2050 | | 1929-1950 |
| WIK | WIEN-KOBENZL | 48.27 | 16.32 | 47.62 | 69.48 | 400 | | 1954 |
| WLH | WILHELMSHAVEN | 53.53 | 8.15 | 54.20 | 94.50 | 10 | | 1884-1911 |
| WIL | WILKES | -66.25 | 110.58 | -77.26 | 182.71 | | | 1957-1966 |
| WNG | WINGST | 53.75 | 9.07 | 54.22 | 95.21 | 50 | 550 | 1939 |
| WNP | WINNIPEG | 49.63 | 262.87 | 59.19 | 326.02 | | | 1969-1975 |
| WIT | WITTEVEEN | 52.82 | 6.67 | 53.79 | 92.39 | 17 | 540 | 1938-1988 |
| YAK | YAKUTSK | 62.02 | 129.72 | 51.53 | 195.40 | 100 | | 1931 |
| TKT | YANGI BAZAR | 41.33 | 69.62 | 32.30 | 145.60 | 500 | | 1964 |
| YAU | YAUCA | -15.53 | 285.33 | -4.54 | 356.36 | | | 1957-1960 |
| YKC | YELLOWKNIFE | 62.47 | 245.53 | 69.14 | 296.56 | 198 | | 1958 |
| YSS | YUZHNO SAKHALINSK | 46.95 | 142.72 | 37.49 | 208.45 | | | 1948 |
| KNK2 | ZAIMISHCHE | 55.83 | 48.85 | 49.20 | 131.60 | 80 | | 1914-1972 |
| ZAR | ZARIA | 11.15 | 7.65 | 13.12 | 80.89 | | | 1964 |
| ZKW | ZI KA WEI | 31.22 | 121.43 | 20.20 | 191.20 | 10 | | 1875-1907 |
| ZIN | ZINZEN | 37.48 | 126.63 | 26.60 | 195.30 | 50 | | 1921-1941 |
| ZSC | ZO SE | 31.10 | 121.19 | 20.00 | 190.80 | 100 | | 1933-1974 |
| ZUY | ZUY | 52.47 | 104.03 | 41.20 | 17.80 | 430 | | 1915-1958 |

*Sites of observatories having provided records over 50 years or more*

| First Observatory Name | Open -Closed | Further Observatories, if any Name | Open -Closed |
|---|---|---|---|
| AGINCOURT | 1881 - 1969 | OTTAWA | 1968 - ... |
| ALIBAG | 1904 - ... | | |
| AMBERLEY | 1929 - 1977 | LAUDER | 1977 - ... |
| ANTANANARIVO | 1890 - 1893 | same | 1902 - 1922 |
| | | same | 1929 - ... |
| APIA | 1905 - ... | | |
| BATAVIA | 1884 - 1944 | KUYPER | 1950 - 1962 |
| | (1899 - 1902 missing) | TANGERANG | 1964 - ... |
| CAPE CHELYUSKIN | 1935 -... | | |
| | (1946-1950 and 1952-1953 missing)) | | |
| CAPE TOWN | 1932 - 1940 | HERMANUS | 1941 - ... |
| CAPE WELLEN | 1933 - ... | | |
| | (1944 - 1949 missing) | | |
| CHELTENHAM | 1904 - 1956 | FREDERICKSBURG | 1956 - ... |
| COIMBRA | 1866 - ... | | |
| COLABA | 1846 - 1905 | ALIBAG | 1904 - ... |
| DIXON | 1933 - ... | | |
| | (1945 and 1947 missing) | | |
| DOMBAS | 1916 - ... | | |
| EBRO | 1910 - ... | | |
| | (1938 - 1942 missing) | | |
| ESKDALEMUIR | 1908 - ... | | |
| FÜRSTENFELDBRUCK | 1939 - ... | | |
| GODHAVN | 1926 - ... | | |
| GREENWICH | 1846 - 1925 | ABINGER | 1925 - 1957 |
| | | HARTLAND | 1957 - ... |
| HELWAN | 1903 - 1959 | MISSALAT | 1960 - ... |
| | (1952 - 1955 missing) | | |
| HURBANOVO | 1941-... | | |
| HONG KONG | 1884 - 1928 | AU TAU | 1928 - 1939 |
| | | HONG KONG | 1972 - ... |
| HONOLULU | 1902 - ... | | |
| HUANCAYO | 1922 - ... | | |
| KAZAN | 1909 - ... | | |
| KELES | 1936 - 1963 | YANGI BAZAR | 1964 - ... |
| KEW | 1858 - 1924 | | |
| KODAIKANAL | 1902 - ... | | |
| KRASNAYA | 1930 - ... | | |
| | (1934 - 1937 and 1939 - 1945 missing) | | |
| LA QUIACA | 1920 - ... | | |
| LENINGRAD | 1869 - 1877 | SLUTSK | 1878 - 1941 |
| | (1871 missing) | VOEIKOVO | 1947 - ... |
| LERWICK | 1923 - ... | | |
| LOVÖ | 1928 - ... | | |
| MANILA | 1891 - 1904 | ANTIPOLO | 1910 - 1938 |
| | | MUNTINLUPA | 1951 - ... |
| MAURITIUS | 1892 - 1965 | | |

*Sites of observatories having provided records over 50 years or more*

| First Observatory Name | Open -Closed | Further Observatories, if any Name | Open -Closed |
|---|---|---|---|
| MEANOOK | 1916 - ... | | |
| MELBOURNE | 1865 - 1921 | TOOLANGUI | 1922 - 1980 |
| | | CANBERRA | 1980 - ... |
| OSLO | 1843 - 1930 | | |
| PILAR | 1905 - ... | | |
| POSTDAM | 1890 - 1907 | SEDDEN | 1908 - 1931 |
| | | NIEMEGK | 1932 - ... |
| RUDE SKOV | 1907 - 1978 | BJORFELDE | 1978 - ... |
| SAINT MAUR | 1883 - 1900 | VAL JOYEUX | 1901 - 1936 |
| | | CHAMBON LA FORET | 1936 - ... |
| SAN FERNANDO | 1891 - ... | | |
| SAN JUAN (PUERTO RICO) | 1903 - 1924 | same | 1926 - 1964 |
| | | same | 1965 - ... |
| SAN MIGUEL | 1911 - ... | | |
| SITKA | 1902 - ... | | |
| SODANKYLA | 1914 - 1931 | | |
| | (1945 missing) | | |
| STONYHURST | 1865 - 1943 | SAME | 1961 - 1967 |
| SVERDLOVSK | 1887 - 1978 | VYSOKAYA - DUBRAVA | 1932 - ... |
| SWIDER | 1921 - ... | | |
| TEOLOYUCAN | 1923 - ... | | |
| TIFLIS | 1879 - 1905 | KARSANI | 1905 - 1934 |
| | | DUSHETI | 1938 - ... |
| TIKHAYA BAY | 1932 - 1958 | HEISS ISLAND | 1959 - ... |
| | (1947 - 1950 missing) | | |
| TIXIE BAY | 1944-... | | |
| | (1948 missing) | | |
| TOKYO | 1897 - 1912 | KAKIOKA | 1913 - ... |
| TROMSÖ | 1930 - ... | | |
| TUCSON | 1910 - ... | | |
| UCCLE | 1896 - 1919 | MANHAY | 1936 - 1971 |
| | | | (1943 - 1945 missing) |
| | | DOURBES | 1955 - ... |
| UTRECHT | 1891 - 1896 | DE BILT | 1899 - 1938 |
| | | WITTEVEEN | 1938 - 1988 |
| VALENTIA | 1899 - ... | | |
| VASSOURAS | 1915 - ... | | |
| WATHEROO | 1919 - 1958 | GNANGARA | 1959 - ... |
| WILHELMSHAFEN | 1884 - 1911 | WINGST | 1939 - ... |
| YAKUTSK | 1931 - ... | | |
| ZAIMISHCHE | 1914 - 1972 | | |
| ZI - KA - WEI | 1875 - 1907 | LUKIAPANG | 1908 - 1933 |
| | | ZO - SE | 1933 - 1974 |

## SECTION 3

# I A G A INDICES

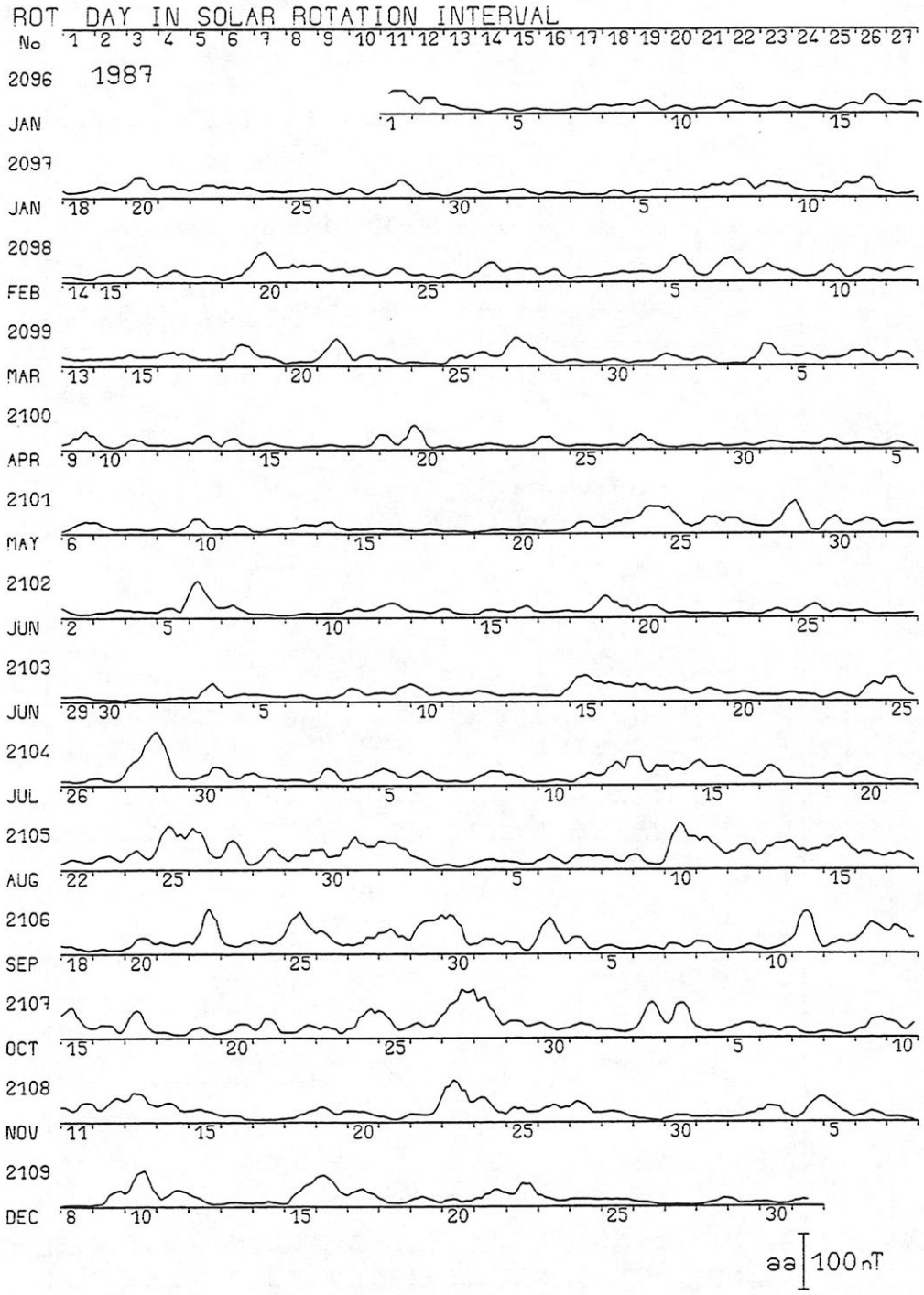

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| 3.2. | **an, as, am** indices | 49 |
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# SECTION 3

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## TWELVE-HOUR RUNNING AVERAGES aa 1987




12-HOUR RUNNING AVERAGES OF THE THREE-HOUR-RANGE INDICES aa 1987

| | JAN. | | | | | FEB. | | | | | MAR. | | | | | APR. | | | | | MAY | | | | | JUNE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DAY | | HALF DAY | | | DAY | | HALF DAY | | | DAY | | HALF DAY | | | DAY | | HALF DAY | | | DAY | | HALF DAY | | | DAY | | HALF DAY | | |
| | N | S | am | pm | | N | S | am | pm | | N | S | am | pm | | N | S | am | pm | | N | S | am | pm | | N | S | am | pm | |
| 1 | 42 | 37 | 37 | 42 | | 14 | 13 | 11 | 16 | C | 19 | 18 | 14 | 23 | | 19 | 17 | 21 | 14 | | 16 | 8 | 10 | 14 | CC | 18 | 11 | 12 | 17 | |
| 2 | 24 | 21 | 16 | 29 | | 8 | 7 | 5 | 9 | CC* | 8 | 6 | 4 | 10 | CK* | 9 | 10 | 12 | 8 | CC | 13 | 7 | 10 | 10 | CC | 17 | 8 | 18 | 7 | KK |
| 3 | 10 | 11 | 14 | 8 | C | 6 | 9 | 9 | 5 | CC* | 17 | 10 | 12 | 16 | | 4 | 2 | 3 | 4 | CK* | 16 | 10 | 14 | 13 | CC | 12 | 8 | 9 | 12 | CC |
| 4 | 7 | 5 | 5 | 8 | CC* | 9 | 8 | 5 | 12 | CC* | 17 | 18 | 17 | 18 | | 23 | 31 | 25 | 29 | | 12 | 7 | 10 | 9 | CC | 17 | 10 | 14 | 12 | CC |
| 5 | 5 | 9 | 5 | 9 | CC* | 8 | 11 | 9 | 10 | CC* | 40 | 34 | 25 | 49 | | 25 | 14 | 18 | 21 | | 12 | 7 | 7 | 12 | CC | 21 | 8 | 10 | 19 | |
| 6 | 4 | 7 | 6 | 6 | CC* | 15 | 15 | 14 | 16 | K | 23 | 9 | 15 | 18 | | 13 | 11 | 10 | 14 | C | 17 | 5 | 5 | 18 | CC | 37 | 56 | 45 | 48 | |
| 7 | 10 | 9 | 8 | 12 | CC | 17 | 17 | 11 | 23 | | 30 | 33 | 40 | 23 | | 25 | 21 | 26 | 20 | | 19 | 14 | 22 | 11 | CC | 25 | 13 | 19 | 19 | |
| 8 | 14 | 15 | 12 | 17 | | 24 | 30 | 21 | 33 | | 26 | 20 | 23 | 23 | | 21 | 17 | 14 | 24 | | 11 | 6 | 9 | 8 | CC | 10 | 5 | 8 | 7 | CC* |
| 9 | 13 | 17 | 19 | 11 | | 26 | 19 | 20 | 25 | | 16 | 9 | 16 | 9 | C | 18 | 14 | 10 | 22 | | 10 | 6 | 10 | 6 | CC | 7 | 5 | 4 | 8 | CC* |
| 10 | 10 | 9 | 11 | 8 | CC | 16 | 11 | 18 | 9 | | 18 | 20 | 17 | 21 | | 22 | 11 | 28 | 5 | | 20 | 19 | 18 | 21 | CC | 12 | 4 | 7 | 9 | CC |
| 11 | 11 | 9 | 8 | 13 | CK | 13 | 11 | 9 | 16 | K | 17 | 18 | 13 | 22 | | 16 | 13 | 12 | 17 | C | 18 | 8 | 10 | 16 | CC | 19 | 8 | 14 | 13 | |
| 12 | 18 | 13 | 20 | 11 | | 34 | 26 | 25 | 35 | | 28 | 17 | 22 | 23 | | 8 | 10 | 9 | 9 | CK | 7 | 4 | 4 | 7 | CC* | 29 | 16 | 19 | 26 | |
| 13 | 16 | 13 | 10 | 19 | C | 8 | 7 | 10 | 6 | C | 17 | 13 | 17 | 13 | | 27 | 14 | 15 | 27 | | 18 | 7 | 9 | 15 | CC | 13 | 9 | 12 | 10 | C |
| 14 | 10 | 9 | 7 | 12 | CC* | 7 | 9 | 9 | 7 | CC* | 18 | 9 | 13 | 14 | | 14 | 14 | 7 | 21 | | 24 | 13 | 15 | 22 | CC | 14 | 10 | 16 | 8 | CC |
| 15 | 10 | 11 | 6 | 16 | KK | 11 | 10 | 6 | 15 | CC | 21 | 15 | 19 | 17 | | 13 | 8 | 8 | 13 | CK | 9 | 6 | 7 | 8 | CC | 16 | 5 | 6 | 15 | CC |
| 16 | 23 | 22 | 15 | 30 | | 22 | 19 | 15 | 26 | | 25 | 19 | 17 | 27 | | 7 | 3 | 6 | 4 | CC | 11 | 8 | 10 | 9 | CC | 22 | 7 | 11 | 19 | |
| 17 | 19 | 15 | 15 | 19 | | 19 | 11 | 8 | 22 | | 19 | 11 | 18 | 12 | | 12 | 5 | 7 | 10 | CC | 10 | 5 | 6 | 9 | CC* | 15 | 7 | 12 | 11 | CK |
| 18 | 14 | 9 | 13 | 11 | C | 14 | 9 | 11 | 12 | CK | 33 | 17 | 13 | 37 | | 9 | 4 | 8 | 5 | CK* | 7 | 2 | 5 | 5 | CC* | 17 | 7 | 13 | 10 | C |
| 19 | 13 | 21 | 16 | 17 | | 9 | 6 | 4 | 12 | C | 27 | 14 | 25 | 16 | | 18 | 21 | 28 | 11 | | 7 | 2 | 3 | 6 | CC* | 31 | 31 | 34 | 28 | |
| 20 | 33 | 27 | 22 | 38 | | 42 | 42 | 37 | 47 | | 6 | 7 | 4 | 8 | CC* | 22 | 30 | 42 | 10 | | 10 | 5 | 8 | 7 | CC | 20 | 13 | 11 | 22 | |
| 21 | 21 | 17 | 16 | 22 | | 31 | 26 | 27 | 30 | | 29 | 27 | 12 | 44 | | 8 | 3 | 7 | 4 | CC* | 7 | 2 | 5 | 4 | CC* | 16 | 7 | 13 | 10 | CK |
| 22 | 19 | 18 | 13 | 24 | | 26 | 25 | 31 | 20 | | 28 | 15 | 25 | 19 | | 12 | 7 | 7 | 12 | CC | 21 | 10 | 9 | 22 | KC | 10 | 5 | 8 | 7 | CC* |
| 23 | 22 | 17 | 21 | 18 | | 22 | 17 | 17 | 22 | | 9 | 12 | 13 | 8 | CK | 9 | 4 | 6 | 7 | CK* | 21 | 14 | 12 | 23 | CK | 11 | 3 | 6 | 8 | CC* |
| 24 | 14 | 14 | 16 | 12 | | 23 | 15 | 12 | 27 | | 7 | 6 | 8 | 6 | CC* | 19 | 19 | 20 | 18 | K | 39 | 39 | 28 | 50 | | 17 | 5 | 6 | 16 | CC |
| 25 | 15 | 9 | 10 | 14 | CC | 13 | 10 | 13 | 10 | C | 17 | 6 | 4 | 19 | KK | 9 | 5 | 6 | 9 | CC | 41 | 31 | 44 | 28 | | 16 | 9 | 7 | 18 | K |
| 26 | 10 | 13 | 15 | 9 | CC | 9 | 11 | 11 | 9 | CK | 23 | 17 | 21 | 19 | | 9 | 6 | 6 | 9 | CK | 27 | 18 | 16 | 29 | | 20 | 9 | 15 | 14 | |
| 27 | 9 | 15 | 15 | 9 | KK | 30 | 23 | 16 | 36 | | 45 | 34 | 34 | 45 | | 18 | 20 | 21 | 17 | K | 28 | 20 | 29 | 19 | | 11 | 7 | 11 | 7 | CC |
| 28 | 25 | 16 | 16 | 25 | | 24 | 22 | 21 | 25 | | 19 | 17 | 27 | 8 | | 8 | 3 | 6 | 5 | CC* | 23 | 11 | 13 | 22 | K | 11 | 2 | 6 | 7 | CC |
| 29 | 16 | 13 | 22 | 8 | | | | | | | 10 | 7 | 11 | 7 | CC | 12 | 4 | 7 | 9 | CC | 27 | 44 | 54 | 17 | K | 14 | 6 | 10 | 11 | CC |
| 30 | 7 | 6 | 4 | 9 | CC* | | | | | | 8 | 8 | 6 | 11 | CC* | 10 | 5 | 6 | 9 | CC | 20 | 20 | 14 | 27 | CC | 6 | 4 | 6 | 4 | CC* |
| 31 | 15 | 11 | 17 | 9 | KC | | | | | | 8 | 6 | 6 | 8 | CC* | | | | | | 20 | 24 | 18 | 26 | CC | | | | | |
| N | 15.5 | | | | | 17.9 | | | | | 20.3 | | | | | 14.6 | | | | | 17.5 | | | | | 16.7 | | | | |
| S | | 14.2 | | | | | 15.7 | | | | | 15.3 | | | | | 11.5 | | | | | 12.2 | | | | | 9.9 | | | |
| M | | | 14.8 | | | | | 16.8 | | | | | 17.8 | | | | | 13.0 | | | | | 14.8 | | | | | 13.3 | | |

| | JULY | | | | | AUG. | | | | | SEP. | | | | | OCT. | | | | | NOV. | | | | | DEC. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DAY | | HALF DAY | | | DAY | | HALF DAY | | | DAY | | HALF DAY | | | DAY | | HALF DAY | | | DAY | | HALF DAY | | | DAY | | HALF DAY | | |
| | N | S | am | pm | | N | S | am | pm | | N | S | am | pm | | N | S | am | pm | | N | S | am | pm | | N | S | am | pm | |
| 1 | 7 | 3 | 3 | 7 | CC* | 25 | 13 | 24 | 14 | | 57 | 44 | 52 | 49 | | 26 | 19 | 18 | 27 | | 21 | 8 | 16 | 13 | | 7 | 10 | 9 | 8 | CC |
| 2 | 8 | 4 | 4 | 8 | CC* | 15 | 5 | 10 | 11 | CC* | 24 | 19 | 26 | 16 | | 17 | 16 | 24 | 10 | | 42 | 34 | 15 | 61 | | 9 | 10 | 9 | 10 | CK |
| 3 | 22 | 9 | 9 | 23 | | 19 | 22 | 12 | 29 | | 8 | 5 | 8 | 5 | CC* | 44 | 44 | 30 | 58 | | 54 | 37 | 28 | 63 | | 26 | 24 | 22 | 28 | |
| 4 | 23 | 9 | 20 | 13 | | 16 | 10 | 10 | 16 | C | 19 | 12 | 12 | 19 | C* | 19 | 23 | 23 | 20 | | 17 | 17 | 21 | 12 | | 20 | 13 | 8 | 25 | |
| 5 | 16 | 9 | 14 | 11 | CC | 26 | 27 | 28 | 25 | | 18 | 9 | 17 | 10 | C * | 12 | 11 | 11 | 11 | CK* | 26 | 15 | 16 | 25 | | 34 | 35 | 46 | 24 | |
| 6 | 15 | 7 | 9 | 13 | CC* | 23 | 15 | 16 | 23 | | 25 | 14 | 16 | 23 | | 15 | 7 | 8 | 14 | CC* | 21 | 13 | 19 | 15 | | 17 | 10 | 8 | 19 | |
| 7 | 9 | 5 | 6 | 8 | CK* | 14 | 4 | 9 | 9 | CK* | 22 | 18 | 14 | 25 | | 8 | 15 | 7 | 16 | K | 11 | 12 | 17 | 7 | KK | 10 | 6 | 8 | 8 | CC |
| 8 | 24 | 14 | 22 | 16 | | 24 | 13 | 11 | 26 | | 29 | 13 | 25 | 17 | | 21 | 14 | 22 | 13 | | 8 | 9 | 10 | 8 | CC* | 4 | 2 | 2 | 4 | CC* |
| 9 | 22 | 10 | 16 | 16 | | 23 | 11 | 19 | 15 | | 22 | 15 | 27 | 11 | | 10 | 6 | 6 | 11 | CC* | 25 | 15 | 10 | 31 | | 12 | 13 | 4 | 21 | KK |
| 10 | 30 | 21 | 33 | 17 | | 12 | 5 | 7 | 10 | CC* | 54 | 46 | 15 | 86 | | 14 | 8 | 12 | 10 | C | 24 | 23 | 31 | 16 | | 48 | 39 | 24 | 63 | |
| 11 | 21 | 10 | 16 | 15 | | 17 | 7 | 7 | 17 | KK | 57 | 51 | 60 | 49 | | 48 | 55 | 26 | 77 | | 27 | 24 | 28 | 23 | | 28 | 23 | 24 | 27 | |
| 12 | 23 | 10 | 16 | 17 | | 36 | 26 | 18 | 44 | | 42 | 29 | 27 | 44 | | 15 | 18 | 9 | 23 | | 41 | 28 | 35 | 34 | | 15 | 19 | 24 | 10 | |
| 13 | 21 | 4 | 11 | 14 | CC | 38 | 37 | 52 | 23 | | 38 | 34 | 24 | 47 | | 50 | 30 | 24 | 56 | | 50 | 41 | 39 | 52 | | 8 | 5 | 5 | 8 | CC* |
| 14 | 16 | 7 | 12 | 11 | C | 30 | 35 | 35 | 30 | | 47 | 35 | 51 | 31 | | 47 | 37 | 40 | 43 | | 40 | 24 | 29 | 35 | | 9 | 7 | 6 | 10 | CC |
| 15 | 42 | 32 | 25 | 49 | | 38 | 38 | 43 | 33 | | 50 | 43 | 42 | 51 | | 40 | 42 | 42 | 40 | | 24 | 19 | 22 | 21 | | 17 | 16 | 4 | 28 | |
| 16 | 36 | 30 | 36 | 31 | | 28 | 21 | 32 | 17 | | 32 | 34 | 34 | 32 | | 24 | 18 | 18 | 24 | | 15 | 10 | 13 | 12 | CK | 57 | 42 | 52 | 47 | |
| 17 | 31 | 23 | 26 | 28 | | 31 | 20 | 20 | 31 | | 31 | 21 | 23 | 29 | | 31 | 33 | 19 | 46 | | 6 | 4 | 5 | 4 | CC* | 30 | 23 | 20 | 33 | |
| 18 | 26 | 20 | 22 | 24 | | 16 | 8 | 13 | 11 | C * | 14 | 12 | 16 | 10 | C * | 10 | 8 | 11 | 7 | C * | 13 | 8 | 7 | 14 | CK* | 16 | 7 | 16 | 7 | C |
| 19 | 23 | 17 | 15 | 24 | | 22 | 13 | 13 | 22 | | 8 | 6 | 8 | 7 | CC* | 15 | 14 | 11 | 17 | K | 25 | 17 | 23 | 19 | | 16 | 12 | 12 | 16 | C |
| 20 | 23 | 8 | 13 | 18 | | 22 | 13 | 17 | 18 | | 22 | 18 | 10 | 29 | | 20 | 13 | 9 | 24 | | 22 | 19 | 21 | 20 | | 8 | 11 | 7 | 13 | CC |
| 21 | 15 | 7 | 11 | 11 | C | 11 | 8 | 10 | 9 | CK* | 19 | 15 | 18 | 16 | | 33 | 19 | 17 | 35 | | 9 | 7 | 11 | 5 | CC | 24 | 11 | 13 | 23 | |
| 22 | 20 | 9 | 16 | 13 | C | 18 | 12 | 12 | 17 | C | 60 | 35 | 23 | 72 | | 14 | 11 | 10 | 15 | C * | 16 | 12 | 15 | 13 | | 48 | 20 | 25 | 43 | |
| 23 | 14 | 6 | 5 | 15 | CC | 24 | 18 | 15 | 27 | | 27 | 16 | 30 | 13 | | 23 | 15 | 20 | 18 | | 57 | 61 | 46 | 72 | | 19 | 14 | 21 | 12 | |
| 24 | 26 | 11 | 7 | 31 | | 23 | 26 | 21 | 29 | | 29 | 16 | 25 | 20 | | 36 | 23 | 17 | 41 | | 35 | 37 | 37 | 35 | | 14 | 13 | 13 | 14 | CC |
| 25 | 34 | 34 | 43 | 26 | | 40 | 74 | 38 | 76 | | 59 | 53 | 35 | 77 | | 40 | 32 | 51 | 21 | | 20 | 21 | 14 | 27 | | 13 | 13 | 12 | 14 | CC |
| 26 | 13 | 3 | 9 | 7 | C * | 57 | 64 | 66 | 54 | | 36 | 27 | 37 | 27 | | 23 | 19 | 22 | 19 | | 32 | 19 | 19 | 33 | | 9 | 8 | 10 | 7 | CC |
| 27 | 17 | 7 | 14 | 10 | CK | 36 | 38 | 24 | 49 | | 20 | 18 | 18 | 20 | | 52 | 60 | 42 | 70 | | 33 | 27 | 27 | 33 | | 4 | 2 | 3 | 3 | CC* |
| 28 | 45 | 33 | 23 | 55 | | 28 | 19 | 10 | 37 | | 41 | 38 | 39 | 40 | | 81 | 62 | 89 | 54 | | 20 | 15 | 17 | 18 | | 8 | 3 | 3 | 8 | CC* |
| 29 | 6564 | | 100 | 29 | | 30 | 16 | 21 | 25 | | 48 | 38 | 25 | 61 | | 30 | 26 | 26 | 30 | | 6 | 8 | 9 | 4 | CC* | 10 | 10 | 14 | 6 | CC |
| 30 | 23 | 13 | 16 | 20 | | 28 | 32 | 36 | 24 | | 66 | 62 | 72 | 56 | | 25 | 19 | 26 | 17 | | 9 | 9 | 6 | 12 | CC* | 6 | 6 | 8 | 4 | CC* |
| 31 | 26 | 20 | 33 | 14 | | 47 | 41 | 40 | 48 | | | | | | | 23 | 20 | 18 | 24 | | | | | | | 9 | 9 | 7 | 11 | CC |
| N | 23.7 | | | | | 26.3 | | | | | 34.2 | | | | | 27.9 | | | | | 24.9 | | | | | 18.0 | | | | |
| S | | 14.8 | | | | | 22.3 | | | | | 26.5 | | | | | 23.6 | | | | | 19.8 | | | | | 14.0 | | | |
| M | | | 19.2 | | | | | 24.3 | | | | | 30.3 | | | | | 25.7 | | | | | 22.3 | | | | | 15.9 | | |

ANNUAL MEAN N : 21.46 S : 16.66 M : 19.02 Unit : nT

# MONTHLY AND YEARLY aa 1868 - 1987

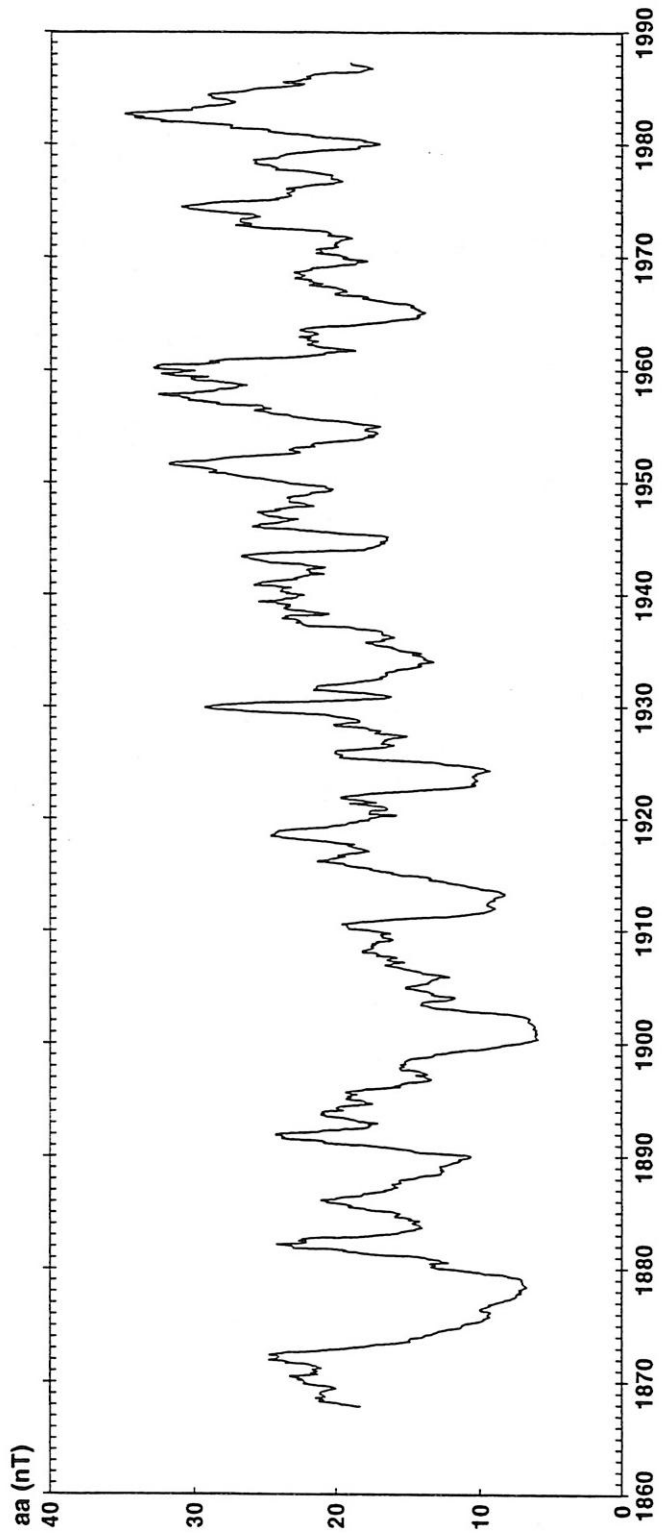
| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1868 | 10.6 | 16.0 | 19.7 | 21.0 | 16.4 | 17.9 | 21.5 | 19.4 | 24.0 | 25.9 | 13.3 | 13.7 | 18.3 |
| 1869 | 19.2 | 23.6 | 22.3 | 29.5 | 23.1 | 19.2 | 17.4 | 19.9 | 29.8 | 17.9 | 14.7 | 14.6 | 20.9 |
| 1870 | 21.6 | 23.2 | 21.2 | 25.8 | 20.9 | 16.4 | 14.1 | 21.4 | 35.2 | 26.2 | 21.9 | 19.9 | 22.3 |
| 1871 | 19.3 | 24.8 | 21.4 | 31.2 | 17.2 | 17.1 | 21.5 | 23.5 | 17.7 | 20.0 | 28.1 | 15.7 | 21.5 |
| 1872 | 17.0 | 28.0 | 23.0 | 23.4 | 20.4 | 17.7 | 25.3 | 25.2 | 20.7 | 38.6 | 25.0 | 20.5 | 23.7 |
| 1873 | 29.4 | 20.6 | 24.1 | 20.8 | 20.8 | 25.8 | 20.6 | 18.7 | 19.3 | 16.6 | 14.6 | 12.1 | 20.3 |
| 1874 | 17.8 | 16.1 | 12.7 | 19.1 | 14.0 | 12.8 | 13.1 | 13.0 | 15.7 | 17.8 | 14.3 | 10.1 | 14.7 |
| 1875 | 10.0 | 13.5 | 12.7 | 12.7 | 13.0 | 10.1 | 11.8 | 8.7 | 13.1 | 11.9 | 9.8 | 8.5 | 11.3 |
| 1876 | 9.8 | 12.6 | 11.0 | 6.5 | 7.6 | 7.7 | 9.1 | 10.2 | 10.1 | 10.5 | 10.2 | 10.1 | 9.6 |
| 1877 | 9.3 | 9.6 | 10.4 | 8.9 | 13.0 | 8.9 | 7.8 | 7.6 | 7.4 | 6.9 | 11.6 | 6.8 | 9.0 |
| 1878 | 7.4 | 7.5 | 6.2 | 8.5 | 7.3 | 8.6 | 4.8 | 6.4 | 7.9 | 6.8 | 7.1 | 9.3 | 7.3 |
| 1879 | 6.2 | 5.8 | 8.6 | 5.5 | 6.2 | 5.9 | 5.8 | 8.0 | 8.9 | 7.0 | 7.1 | 9.3 | 7.0 |
| 1880 | 7.3 | 4.7 | 9.8 | 8.9 | 13.1 | 7.3 | 9.9 | 23.1 | 11.4 | 14.4 | 14.5 | 14.6 | 11.6 |
| 1881 | 15.1 | 12.8 | 13.2 | 11.4 | 8.5 | 10.7 | 12.2 | 7.8 | 17.9 | 14.0 | 20.2 | 20.3 | 13.7 |
| 1882 | 15.7 | 19.5 | 16.5 | 35.9 | 20.6 | 19.0 | 14.5 | 19.7 | 15.0 | 25.0 | 55.0 | 20.1 | 23.0 |
| 1883 | 15.4 | 26.7 | 23.3 | 17.8 | 13.9 | 18.5 | 21.5 | 12.4 | 19.5 | 13.7 | 17.6 | 12.0 | 17.7 |
| 1884 | 9.1 | 14.3 | 17.5 | 15.6 | 12.8 | 13.1 | 15.5 | 13.0 | 13.5 | 16.0 | 16.9 | 13.2 | 14.2 |
| 1885 | 13.2 | 15.5 | 13.3 | 14.0 | 21.2 | 14.2 | 13.0 | 17.7 | 22.1 | 15.9 | 13.7 | 12.1 | 15.5 |
| 1886 | 17.7 | 17.1 | 27.6 | 21.6 | 22.6 | 21.6 | 19.3 | 18.1 | 19.0 | 21.7 | 20.7 | 20.6 | 20.6 |
| 1887 | 16.9 | 22.9 | 15.2 | 20.6 | 17.3 | 12.6 | 12.5 | 17.2 | 18.9 | 14.1 | 14.5 | 15.2 | 16.5 |
| 1888 | 18.2 | 15.9 | 15.2 | 16.4 | 19.3 | 14.5 | 12.9 | 13.7 | 15.1 | 15.0 | 15.3 | 14.0 | 15.5 |
| 1889 | 9.8 | 11.0 | 13.9 | 11.6 | 10.2 | 9.8 | 13.5 | 12.6 | 14.6 | 13.6 | 18.5 | 11.8 | 12.6 |
| 1890 | 11.7 | 11.8 | 10.0 | 8.4 | 8.4 | 7.3 | 10.0 | 10.3 | 13.8 | 15.6 | 13.3 | 8.3 | 10.7 |
| 1891 | 10.4 | 14.2 | 20.6 | 22.5 | 23.7 | 11.7 | 11.2 | 15.0 | 22.3 | 20.7 | 16.5 | 16.2 | 17.1 |
| 1892 | 19.5 | 35.1 | 36.3 | 20.4 | 25.1 | 17.7 | 33.7 | 22.1 | 20.1 | 23.1 | 15.7 | 22.1 | 24.2 |
| 1893 | 18.2 | 19.1 | 18.4 | 14.0 | 12.0 | 17.1 | 14.5 | 18.5 | 19.5 | 20.9 | 18.5 | 13.9 | 17.0 |
| 1894 | 19.2 | 33.9 | 20.0 | 17.4 | 19.0 | 20.0 | 26.3 | 21.0 | 22.5 | 17.0 | 21.9 | 12.0 | 20.9 |
| 1895 | 15.4 | 20.8 | 23.0 | 20.7 | 16.6 | 17.6 | 17.9 | 10.5 | 15.9 | 22.7 | 22.5 | 14.5 | 18.2 |
| 1896 | 25.4 | 23.6 | 21.8 | 17.2 | 20.6 | 11.7 | 15.6 | 18.1 | 17.8 | 17.5 | 13.1 | 13.8 | 18.0 |
| 1897 | 12.0 | 14.0 | 14.2 | 22.2 | 14.6 | 12.0 | 9.3 | 10.7 | 11.0 | 13.8 | 12.6 | 17.2 | 13.6 |
| 1898 | 13.5 | 15.1 | 20.5 | 13.4 | 15.1 | 14.3 | 13.5 | 14.6 | 21.5 | 14.1 | 13.6 | 13.0 | 15.2 |
| 1899 | 14.3 | 17.8 | 15.6 | 14.2 | 15.9 | 13.5 | 11.6 | 11.4 | 13.5 | 9.4 | 8.7 | 12.1 | 13.2 |
| 1900 | 13.5 | 8.9 | 12.5 | 7.2 | 9.6 | 4.7 | 5.2 | 6.0 | 5.2 | 7.1 | 5.4 | 5.4 | 7.6 |
| 1901 | 7.3 | 7.0 | 6.5 | 5.2 | 6.2 | 6.0 | 5.6 | 6.1 | 6.0 | 5.4 | 5.6 | 6.4 | 6.1 |
| 1902 | 6.1 | 7.6 | 5.9 | 7.9 | 5.6 | 5.4 | 6.3 | 6.2 | 7.0 | 7.2 | 7.6 | 6.1 | 6.6 |
| 1903 | 6.5 | 5.9 | 6.7 | 10.3 | 7.8 | 11.3 | 10.8 | 14.1 | 14.0 | 26.3 | 16.3 | 13.5 | 12.0 |
| 1904 | 15.1 | 12.6 | 8.7 | 13.1 | 13.0 | 10.5 | 10.8 | 10.2 | 11.2 | 13.0 | 11.6 | 10.6 | 11.7 |
| 1905 | 16.0 | 20.3 | 16.6 | 16.6 | 10.6 | 13.8 | 11.8 | 16.8 | 16.3 | 11.2 | 20.1 | 10.7 | 15.1 |
| 1906 | 7.6 | 17.5 | 14.0 | 11.6 | 11.4 | 11.3 | 12.4 | 12.0 | 14.2 | 12.7 | 9.6 | 16.4 | 12.6 |
| 1907 | 16.5 | 25.3 | 14.3 | 12.1 | 16.8 | 14.8 | 16.9 | 15.5 | 16.8 | 18.5 | 14.6 | 11.5 | 16.1 |
| 1908 | 13.6 | 17.0 | 23.2 | 15.6 | 18.9 | 12.5 | 10.4 | 18.2 | 31.6 | 15.8 | 17.4 | 11.4 | 17.1 |
| 1909 | 24.8 | 17.0 | 19.8 | 12.1 | 18.3 | 11.5 | 12.6 | 17.6 | 27.6 | 19.4 | 11.6 | 13.8 | 17.2 |
| 1910 | 12.8 | 14.6 | 20.9 | 19.7 | 17.2 | 13.7 | 10.8 | 20.2 | 19.2 | 24.4 | 17.9 | 19.5 | 17.6 |
| 1911 | 21.3 | 23.7 | 21.5 | 21.1 | 16.6 | 13.6 | 15.3 | 11.9 | 12.2 | 12.5 | 10.6 | 11.0 | 15.9 |
| 1912 | 7.6 | 8.0 | 7.7 | 9.4 | 9.6 | 8.4 | 7.8 | 10.5 | 9.8 | 9.5 | 9.4 | 9.4 | 8.9 |
| 1913 | 10.3 | 9.5 | 9.9 | 9.8 | 9.0 | 7.0 | 7.0 | 6.7 | 10.0 | 10.7 | 7.6 | 6.6 | 8.7 |
| 1914 | 7.1 | 7.3 | 10.1 | 13.5 | 8.1 | 10.3 | 12.9 | 14.9 | 11.8 | 13.3 | 13.4 | 9.3 | 11.0 |
| 1915 | 10.9 | 13.5 | 15.0 | 15.3 | 13.9 | 17.9 | 11.2 | 14.7 | 17.0 | 21.3 | 24.9 | 12.4 | 15.7 |
| 1916 | 16.0 | 11.6 | 25.0 | 19.2 | 20.2 | 15.7 | 19.7 | 21.4 | 22.4 | 24.5 | 24.0 | 18.9 | 19.9 |
| 1917 | 25.1 | 19.1 | 16.2 | 16.7 | 15.9 | 12.7 | 14.6 | 28.1 | 16.1 | 20.2 | 14.8 | 19.8 | 18.3 |
| 1918 | 17.8 | 21.3 | 19.7 | 20.5 | 18.8 | 15.6 | 17.4 | 22.2 | 28.4 | 26.4 | 23.1 | 28.1 | 21.6 |
| 1919 | 27.8 | 26.5 | 30.7 | 21.3 | 27.5 | 13.9 | 14.9 | 22.7 | 25.3 | 26.9 | 14.3 | 18.4 | 22.5 |
| 1920 | 16.7 | 14.1 | 28.5 | 17.8 | 17.7 | 12.4 | 14.0 | 14.8 | 25.7 | 17.3 | 15.1 | 17.0 | 17.6 |
| 1921 | 11.7 | 10.6 | 15.6 | 17.2 | 40.5 | 12.4 | 13.3 | 14.6 | 12.4 | 16.2 | 16.2 | 17.8 | 16.5 |
| 1922 | 18.0 | 18.6 | 24.1 | 23.5 | 18.3 | 18.6 | 20.0 | 20.7 | 19.7 | 20.1 | 13.1 | 10.4 | 18.8 |
| 1923 | 10.2 | 13.7 | 12.1 | 10.0 | 10.1 | 11.1 | 8.4 | 7.3 | 10.7 | 12.6 | 7.8 | 9.6 | 10.3 |
| 1924 | 13.6 | 10.9 | 12.9 | 7.3 | 10.2 | 12.3 | 9.7 | 6.9 | 12.6 | 8.7 | 9.3 | 7.9 | 10.2 |
| 1925 | 9.4 | 8.6 | 8.6 | 10.8 | 11.0 | 17.7 | 11.8 | 13.6 | 18.0 | 21.7 | 13.2 | 12.9 | 13.1 |
| 1926 | 27.1 | 26.2 | 27.6 | 27.1 | 19.6 | 16.2 | 11.4 | 13.2 | 22.7 | 23.3 | 11.9 | 13.3 | 20.0 |
| 1927 | 15.5 | 15.2 | 20.7 | 15.6 | 16.8 | 11.2 | 16.5 | 18.5 | 20.9 | 24.7 | 8.0 | 15.8 | 16.6 |
| 1928 | 10.1 | 13.5 | 11.3 | 12.8 | 23.6 | 20.2 | 27.8 | 15.9 | 19.6 | 23.4 | 18.2 | 15.6 | 17.7 |
| 1929 | 13.0 | 24.0 | 26.2 | 13.9 | 16.3 | 14.7 | 18.6 | 15.9 | 21.5 | 25.5 | 22.7 | 21.0 | 19.4 |
| 1930 | 20.9 | 27.9 | 30.9 | 38.2 | 36.4 | 33.3 | 28.3 | 33.3 | 28.8 | 29.3 | 18.8 | 17.2 | 28.6 |

## MONTHLY AND YEARLY aa 1868 - 1987 (continued)

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1931 | 13.0 | 15.4 | 12.9 | 9.9 | 12.0 | 14.7 | 13.1 | 17.7 | 21.2 | 27.3 | 23.7 | 21.1 | 16.8 |
| 1932 | 20.2 | 21.4 | 27.9 | 28.2 | 22.2 | 11.8 | 12.4 | 19.1 | 19.1 | 17.2 | 13.8 | 15.3 | 19.1 |
| 1933 | 15.9 | 18.4 | 19.2 | 21.1 | 17.5 | 13.6 | 12.3 | 14.2 | 18.4 | 16.8 | 16.0 | 13.0 | 16.4 |
| 1934 | 11.5 | 14.9 | 20.0 | 11.3 | 11.4 | 10.0 | 10.3 | 17.4 | 17.6 | 11.6 | 9.5 | 15.5 | 13.4 |
| 1935 | 15.6 | 16.5 | 17.8 | 13.6 | 11.6 | 16.4 | 12.5 | 9.9 | 20.7 | 20.2 | 15.6 | 17.7 | 15.7 |
| 1936 | 17.4 | 19.8 | 15.5 | 22.1 | 17.5 | 19.8 | 18.0 | 10.2 | 9.8 | 15.4 | 18.0 | 12.0 | 16.3 |
| 1937 | 12.2 | 22.2 | 18.6 | 26.3 | 18.6 | 18.9 | 18.8 | 14.7 | 14.7 | 27.8 | 19.3 | 16.5 | 19.1 |
| 1938 | 46.6 | 26.0 | 20.4 | 26.1 | 23.7 | 14.8 | 19.7 | 19.9 | 24.7 | 24.0 | 17.8 | 19.5 | 23.6 |
| 1939 | 13.5 | 21.7 | 27.0 | 36.1 | 27.8 | 22.8 | 26.1 | 23.0 | 19.2 | 28.4 | 14.5 | 18.6 | 23.2 |
| 1940 | 24.8 | 20.1 | 43.9 | 22.4 | 20.0 | 23.6 | 18.4 | 18.4 | 20.1 | 21.9 | 25.1 | 23.7 | 23.5 |
| 1941 | 21.9 | 27.6 | 42.9 | 21.6 | 19.1 | 17.4 | 27.9 | 22.3 | 38.2 | 17.5 | 23.6 | 19.3 | 24.9 |
| 1942 | 14.6 | 18.8 | 32.4 | 24.4 | 14.2 | 14.6 | 23.0 | 21.9 | 25.8 | 30.3 | 22.8 | 18.4 | 21.8 |
| 1943 | 18.1 | 17.1 | 21.0 | 21.9 | 24.5 | 21.2 | 24.4 | 41.0 | 35.3 | 32.8 | 29.6 | 23.3 | 25.8 |
| 1944 | 21.2 | 17.9 | 26.6 | 21.6 | 16.1 | 14.9 | 11.1 | 16.5 | 17.5 | 17.2 | 11.2 | 21.8 | 17.8 |
| 1945 | 16.1 | 16.4 | 25.0 | 19.1 | 15.4 | 11.1 | 15.3 | 12.1 | 15.6 | 17.9 | 12.0 | 20.2 | 16.4 |
| 1946 | 19.2 | 30.2 | 43.5 | 25.0 | 24.1 | 22.3 | 28.6 | 16.7 | 41.7 | 19.6 | 19.3 | 14.3 | 25.4 |
| 1947 | 20.6 | 17.1 | 37.9 | 23.3 | 19.1 | 21.1 | 21.4 | 32.9 | 39.1 | 31.3 | 20.7 | 17.9 | 25.2 |
| 1948 | 20.8 | 21.0 | 24.2 | 17.7 | 23.7 | 15.0 | 16.2 | 28.3 | 22.0 | 36.1 | 23.1 | 23.0 | 22.6 |
| 1949 | 29.8 | 20.4 | 24.7 | 17.6 | 22.4 | 17.9 | 11.8 | 19.2 | 17.8 | 32.7 | 24.6 | 15.1 | 21.2 |
| 1950 | 19.5 | 23.2 | 20.6 | 23.8 | 21.7 | 19.0 | 19.5 | 30.2 | 29.3 | 34.5 | 28.0 | 24.0 | 24.4 |
| 1951 | 23.1 | 29.2 | 28.5 | 32.1 | 25.5 | 23.2 | 25.2 | 29.7 | 44.4 | 30.3 | 25.7 | 28.2 | 28.8 |
| 1952 | 28.5 | 34.3 | 40.1 | 38.0 | 33.1 | 23.8 | 20.7 | 19.0 | 28.5 | 26.4 | 18.9 | 23.4 | 27.9 |
| 1953 | 22.3 | 21.2 | 27.4 | 22.7 | 21.4 | 18.4 | 22.5 | 26.1 | 29.0 | 22.4 | 20.2 | 12.6 | 22.2 |
| 1954 | 13.9 | 24.5 | 25.5 | 20.6 | 12.0 | 9.7 | 13.1 | 16.5 | 25.4 | 21.1 | 14.5 | 10.9 | 17.3 |
| 1955 | 19.3 | 18.2 | 23.6 | 21.1 | 16.7 | 15.1 | 12.3 | 14.3 | 19.1 | 17.8 | 19.9 | 14.1 | 17.6 |
| 1956 | 28.7 | 23.3 | 27.6 | 31.7 | 29.3 | 23.5 | 19.8 | 20.7 | 22.4 | 19.3 | 32.3 | 18.2 | 24.7 |
| 1957 | 28.7 | 26.8 | 36.7 | 28.8 | 18.1 | 29.1 | 21.7 | 20.7 | 57.0 | 24.0 | 29.5 | 31.7 | 29.4 |
| 1958 | 25.5 | 43.2 | 36.1 | 27.6 | 25.2 | 29.7 | 36.0 | 25.1 | 26.5 | 24.7 | 15.0 | 27.2 | 28.5 |
| 1959 | 24.3 | 35.9 | 29.9 | 24.2 | 25.7 | 21.6 | 42.5 | 31.2 | 36.1 | 28.2 | 32.1 | 30.8 | 30.2 |
| 1960 | 25.2 | 23.5 | 27.6 | 51.5 | 31.6 | 27.6 | 28.1 | 27.2 | 26.4 | 45.6 | 45.9 | 34.5 | 32.9 |
| 1961 | 20.6 | 25.1 | 22.0 | 21.8 | 22.3 | 20.1 | 36.0 | 18.5 | 20.7 | 23.3 | 17.3 | 21.1 | 22.4 |
| 1962 | 13.2 | 19.2 | 15.5 | 22.6 | 13.4 | 18.1 | 21.0 | 26.2 | 29.8 | 33.3 | 22.5 | 23.5 | 21.5 |
| 1963 | 19.3 | 15.3 | 14.9 | 18.2 | 20.4 | 20.5 | 20.8 | 22.5 | 40.2 | 23.5 | 20.7 | 18.9 | 21.3 |
| 1964 | 20.1 | 20.1 | 21.0 | 21.7 | 17.5 | 15.1 | 16.9 | 14.8 | 18.2 | 16.9 | 13.8 | 10.3 | 17.2 |
| 1965 | 11.8 | 16.3 | 14.3 | 12.6 | 10.5 | 15.7 | 14.7 | 16.8 | 17.5 | 13.1 | 11.7 | 13.8 | 14.1 |
| 1966 | 14.2 | 14.8 | 18.6 | 12.0 | 14.8 | 12.5 | 17.1 | 20.0 | 29.4 | 17.5 | 16.8 | 20.5 | 17.4 |
| 1967 | 18.9 | 19.8 | 13.8 | 15.5 | 33.1 | 18.6 | 14.4 | 17.5 | 24.7 | 17.8 | 18.9 | 24.5 | 19.8 |
| 1968 | 21.1 | 26.5 | 23.3 | 22.2 | 21.4 | 24.9 | 18.0 | 20.1 | 22.0 | 24.8 | 26.2 | 20.3 | 22.6 |
| 1969 | 17.8 | 25.8 | 27.3 | 23.6 | 25.2 | 16.7 | 15.0 | 15.3 | 23.8 | 17.2 | 18.7 | 13.8 | 20.0 |
| 1970 | 14.4 | 12.7 | 26.4 | 23.1 | 16.6 | 18.3 | 28.4 | 21.0 | 19.7 | 20.6 | 21.6 | 16.5 | 19.9 |
| 1971 | 23.5 | 21.2 | 21.1 | 23.9 | 21.1 | 17.0 | 15.2 | 17.1 | 21.4 | 22.2 | 18.8 | 18.6 | 20.1 |
| 1972 | 21.9 | 18.3 | 21.5 | 18.1 | 16.6 | 21.5 | 14.0 | 34.2 | 20.4 | 20.4 | 21.8 | 18.9 | 20.6 |
| 1973 | 26.1 | 32.7 | 36.9 | 39.6 | 26.1 | 27.3 | 20.9 | 20.6 | 22.8 | 28.2 | 20.7 | 19.9 | 26.8 |
| 1974 | 25.8 | 26.4 | 33.7 | 32.9 | 29.2 | 29.2 | 32.0 | 30.2 | 33.7 | 37.3 | 26.8 | 27.5 | 30.4 |
| 1975 | 27.6 | 31.1 | 32.0 | 24.3 | 22.7 | 20.7 | 21.7 | 18.1 | 16.9 | 20.2 | 29.3 | 21.1 | 23.8 |
| 1976 | 23.3 | 28.5 | 33.4 | 25.4 | 23.7 | 17.5 | 18.4 | 17.7 | 23.7 | 20.4 | 16.9 | 18.6 | 22.3 |
| 1977 | 18.7 | 21.0 | 19.9 | 24.9 | 20.1 | 14.2 | 22.9 | 23.2 | 23.0 | 20.9 | 17.3 | 17.0 | 20.3 |
| 1978 | 25.0 | 26.2 | 25.9 | 31.3 | 31.2 | 28.3 | 19.9 | 25.6 | 27.0 | 20.8 | 24.6 | 22.0 | 25.6 |
| 1979 | 27.3 | 23.7 | 26.9 | 33.5 | 21.0 | 18.3 | 17.9 | 26.0 | 22.0 | 19.3 | 17.1 | 16.8 | 22.5 |
| 1980 | 19.0 | 17.3 | 12.7 | 18.4 | 15.6 | 20.0 | 17.0 | 15.9 | 14.2 | 21.9 | 23.3 | 21.7 | 18.1 |
| 1981 | 16.8 | 22.9 | 27.1 | 33.4 | 27.3 | 18.1 | 27.6 | 24.3 | 20.8 | 34.4 | 24.5 | 19.7 | 24.7 |
| 1982 | 23.5 | 49.3 | 27.6 | 32.2 | 26.2 | 31.4 | 42.4 | 32.0 | 45.9 | 28.9 | 33.7 | 34.5 | 34.0 |
| 1983 | 26.6 | 40.8 | 34.2 | 36.3 | 32.1 | 25.1 | 21.4 | 25.2 | 24.0 | 28.8 | 34.1 | 26.4 | 29.6 |
| 1984 | 23.8 | 26.5 | 31.3 | 33.1 | 27.5 | 24.0 | 26.7 | 26.2 | 33.2 | 33.7 | 31.5 | 29.4 | 28.9 |
| 1985 | 26.1 | 24.4 | 19.2 | 30.0 | 15.7 | 20.1 | 23.7 | 22.3 | 21.4 | 22.5 | 24.0 | 21.5 | 22.6 |
| 1986 | 22.7 | 40.5 | 21.3 | 14.4 | 18.9 | 16.0 | 16.5 | 22.6 | 25.0 | 18.8 | 21.5 | 15.4 | 21.1 |
| 1987 | 14.8 | 16.8 | 17.8 | 13.0 | 14.8 | 13.3 | 19.2 | 24.3 | 30.3 | 25.7 | 22.3 | 15.9 | 19.0 |

Unit : nT

TWELVE-MONTH RUNNING MEAN VALUES OF aa 1868 - 1987

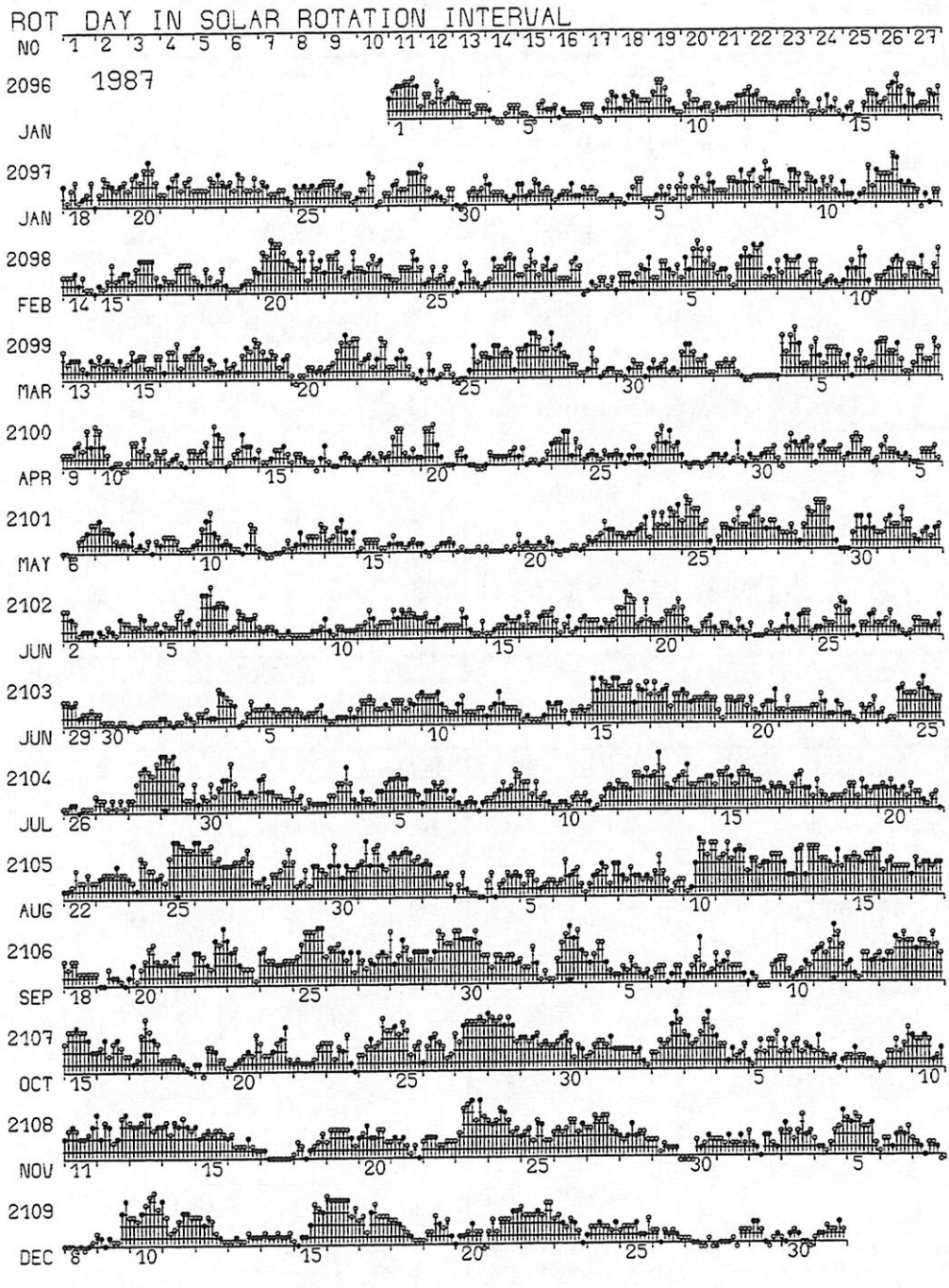


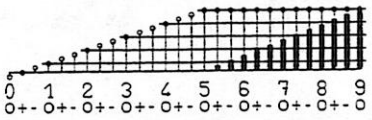
# SECTION 3

## 3.2. an, as, am INDICES


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- Monthly tables of three-hour indices :
  **an**, **as**, **Kn**, **Ks** and daily **An**, **As** values 52
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  1959 - 1987 70

## MUSICAL DIAGRAM OF **Km** 1987




THREE-HOUR-RANGE INDICES
Km 1987

**JANUARY 1987**

| | Kn | | | | | | | | σn | | an | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 2+ | 3o | 3o | 3+ | 3+ | 4o | 3o | 4331 | 3553 | 15 | 18 | 33 | 32 | 38 | 40 | 51 | 30 | 32 |
| 2 | 1o | 2+ | 2+ | 2o | 4- | 3o | 2- | 2- | 2422 | 4433 | 6 | 18 | 20 | 14 | 42 | 30 | 11 | 11 | 19 |
| 3 | 2o | 2o | 2o | 2o | 2- | 1- | 1+ | 1+ | 2244 | 2123 | 14 | 14 | 15 | 14 | 11 | 5 | 9 | 8 | 11 |
| 4 | 1+ | 1- | 0+ | 0o | 0o | 1o | 1+ | 1+ | 3221 | 1112 | 10 | 5 | 2 | 1 | 1 | 6 | 8 | 8 | 5 |
| 5 | 1o | 1- | 1- | 0+ | 0o | 1+ | 1+ | 1o | 1232 | 1231 | 7 | 4 | 4 | 2 | 1 | 9 | 10 | 7 | 6 |
| 6 | 1- | 1+ | 1- | 1o | 1o | 1- | 1- | 1o | 1223 | 1132 | 5 | 8 | 4 | 6 | 6 | 4 | 4 | 7 | 6 |
| 7 | 1+ | 1+ | 1o | 0+ | 0o | 1o | 1+ | 2+ | 2432 | 1245 | 8 | 8 | 7 | 3 | 1 | 6 | 10 | 20 | 8 |
| 8 | 2- | 1o | 2- | 2- | 2+ | 2o | 2o | 2- | 2232 | 4034 | 12 | 6 | 13 | 12 | 18 | 14 | 15 | 13 | 13 |
| 9 | 1+ | 2+ | 4- | 4- | 3- | 2- | 1o | 1- | 2355 | 3222 | 10 | 18 | 47 | 47 | 21 | 12 | 7 | 5 | 21 |
| 10 | 1- | 1+ | 2+ | 1+ | 2- | 1+ | 1+ | 1+ | 3332 | 3223 | 4 | 9 | 20 | 10 | 12 | 9 | 8 | 8 | 10 |
| 11 | 1- | 1+ | 1o | 1- | 1o | 2- | 2o | 2o | 2243 | 2312 | 4 | 9 | 7 | 5 | 7 | 11 | 16 | 15 | 9 |
| 12 | 2+ | 3- | 2o | 2+ | 2o | 2o | 1+ | 1+ | 2222 | 4213 | 17 | 21 | 16 | 17 | 14 | 15 | 9 | 9 | 15 |
| 13 | 1+ | 1o | 1+ | 1+ | 2- | 2+ | 2o | 1+ | 2133 | 3543 | 8 | 6 | 8 | 10 | 11 | 20 | 16 | 8 | 11 |
| 14 | 1- | 1- | 2- | 1- | 2o | 1+ | 2o | 1- | 3232 | 3144 | 5 | 5 | 13 | 5 | 16 | 8 | 16 | 4 | 9 |
| 15 | 0o | 1- | 1- | 0+ | 0+ | 1+ | 2+ | 3- | 1222 | 1144 | 1 | 5 | 5 | 2 | 2 | 9 | 18 | 22 | 8 |
| 16 | 2o | 1+ | 2- | 3o | 3+ | 4o | 3o | 1o | 1423 | 4531 | 16 | 10 | 12 | 29 | 35 | 53 | 28 | 7 | 24 |
| 17 | 2+ | 2+ | 1o | 1o | 2- | 2+ | 2o | 3+ | 5321 | 2502 | 19 | 17 | 6 | 7 | 11 | 20 | 14 | 36 | 16 |
| 18 | 2+ | 1o | 2- | 2+ | 1- | 1+ | 2- | 3- | 3142 | 1224 | 18 | 6 | 11 | 17 | 5 | 8 | 11 | 23 | 12 |
| 19 | 1- | 1o | 3- | 2+ | 2o | 2- | 2o | 2o | 2123 | 3301 | 4 | 7 | 25 | 19 | 16 | 13 | 14 | 15 | 14 |
| 20 | 1+ | 3- | 3o | 2+ | 3+ | 4+ | 4- | 2o | 2342 | 3333 | 10 | 26 | 31 | 19 | 35 | 64 | 42 | 16 | 30 |
| 21 | 1+ | 1+ | 2- | 2+ | 3+ | 2- | 2+ | 3- | 1222 | 3225 | 8 | 10 | 13 | 20 | 34 | 13 | 19 | 22 | 17 |
| 22 | 2- | 2- | 2- | 1+ | 3- | 2+ | 3o | 3- | 3122 | 4323 | 11 | 13 | 12 | 10 | 25 | 19 | 32 | 21 | 18 |
| 23 | 2+ | 2+ | 2- | 4- | 3- | 2o | 2- | 3- | 3333 | 4334 | 17 | 19 | 13 | 41 | 25 | 14 | 12 | 22 | 20 |
| 24 | 2- | 2+ | 2+ | 1+ | 1+ | 2o | 2o | 1o | 1443 | 1333 | 13 | 17 | 17 | 9 | 9 | 15 | 14 | 7 | 13 |
| 25 | 0+ | 2+ | 2- | 2- | 2- | 2+ | 2- | 2- | 2541 | 2323 | 3 | 17 | 12 | 13 | 11 | 17 | 12 | 13 | 12 |
| 26 | 2+ | 2o | 2o | 1+ | 2+ | 2- | 1+ | 0+ | 5222 | 3223 | 17 | 15 | 16 | 10 | 19 | 11 | 9 | 3 | 13 |
| 27 | 1- | 2- | 2- | 3o | 3- | 1- | 1o | 1o | 2322 | 3212 | 5 | 13 | 11 | 30 | 26 | 5 | 6 | 6 | 13 |
| 28 | 2- | 2- | 2o | 2- | 2o | 3+ | 3o | 3o | 3223 | 1532 | 11 | 13 | 15 | 11 | 14 | 37 | 32 | 32 | 21 |
| 29 | 4o | 2+ | 2- | 1+ | 1+ | 1o | 1- | 1+ | 5321 | 2124 | 51 | 20 | 13 | 8 | 8 | 7 | 5 | 10 | 15 |
| 30 | 2- | 0o | 0o | 0+ | 1+ | 2o | 2- | 1+ | 3112 | 3122 | 12 | 1 | 1 | 3 | 8 | 14 | 11 | 9 | 7 |
| 31 | 3- | 2+ | 1+ | 2- | 1+ | 1+ | 1o | 1+ | 2433 | 3213 | 23 | 18 | 10 | 12 | 10 | 8 | 6 | 8 | 12 |
| | | | | | | | | | | | Monthly mean value of An | | | | | | | | 14.2 |

**JANUARY 1987**

| | Ks | | | | | | | | σs | | as | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 3o | 3o | 3o | 3+ | 3+ | 3+ | 3- | 1331 | 2321 | 16 | 28 | 30 | 33 | 35 | 34 | 37 | 24 | 30 |
| 2 | 1o | 2+ | 2o | 2- | 3+ | 2+ | 2- | 2+ | 1301 | 2223 | 6 | 19 | 15 | 12 | 38 | 20 | 12 | 18 | 18 |
| 3 | 3- | 2- | 1+ | 2- | 2- | 1- | 1o | 1+ | 2222 | 1231 | 22 | 12 | 10 | 11 | 11 | 5 | 6 | 8 | 11 |
| 4 | 1- | 1o | 0+ | 0o | 0o | 1- | 1o | 1o | 2211 | 0222 | 5 | 6 | 2 | 1 | 0 | 4 | 7 | 7 | 4 |
| 5 | 1+ | 1- | 1- | 0+ | 0o | 1+ | 2- | 1o | 2321 | 0432 | 10 | 4 | 4 | 2 | 0 | 10 | 12 | 6 | 6 |
| 6 | 1+ | 1o | 0+ | 1o | 1o | 1- | 1o | 1- | 3222 | 1231 | 8 | 7 | 3 | 6 | 6 | 4 | 6 | 4 | 6 |
| 7 | 1+ | 1o | 1o | 0+ | 0o | 1o | 2- | 2+ | 2343 | 2242 | 10 | 6 | 7 | 3 | 1 | 7 | 11 | 20 | 8 |
| 8 | 2+ | 1o | 2- | 2o | 2o | 2o | 2- | 1+ | 1320 | 2522 | 17 | 7 | 13 | 15 | 16 | 16 | 12 | 10 | 13 |
| 9 | 2- | 2o | 3- | 3- | 3- | 2- | 1- | 0+ | 2032 | 3322 | 11 | 15 | 24 | 24 | 21 | 11 | 5 | 3 | 14 |
| 10 | 1- | 1+ | 2o | 2- | 1+ | 1- | 1+ | 1o | 3203 | 2233 | 4 | 10 | 15 | 12 | 10 | 5 | 8 | 7 | 9 |
| 11 | 0+ | 1+ | 1o | 1o | 1+ | 1+ | 2- | 2+ | 0311 | 2421 | 3 | 9 | 7 | 7 | 9 | 10 | 13 | 17 | 9 |
| 12 | 2+ | 2+ | 2+ | 3- | 1+ | 1o | 1+ | 1o | 3221 | 2131 | 19 | 20 | 18 | 23 | 10 | 7 | 9 | 6 | 14 |
| 13 | 1o | 1o | 2- | 1+ | 2- | 2+ | 2- | 2- | 2422 | 3322 | 6 | 6 | 11 | 10 | 13 | 17 | 11 | 11 | 11 |
| 14 | 0+ | 1- | 1+ | 1- | 2- | 1o | 1+ | 1- | 2312 | 4323 | 3 | 4 | 9 | 4 | 11 | 6 | 10 | 5 | 7 |
| 15 | 0+ | 1o | 1+ | 1o | 1- | 1+ | 3- | 2+ | 2224 | 3222 | 3 | 7 | 9 | 7 | 5 | 8 | 22 | 20 | 10 |
| 16 | 2- | 1o | 2o | 3- | 3o | 3+ | 2o | 1o | 1202 | 3322 | 13 | 7 | 15 | 22 | 27 | 34 | 16 | 7 | 18 |
| 17 | 2o | 2- | 1+ | 1+ | 1+ | 2o | 2- | 2+ | 4312 | 1413 | 16 | 12 | 8 | 10 | 9 | 15 | 13 | 18 | 13 |
| 18 | 2- | 1- | 2- | 2o | 0+ | 1o | 1+ | 2o | 2314 | 2233 | 11 | 4 | 13 | 16 | 3 | 7 | 9 | 15 | 10 |
| 19 | 1- | 1+ | 3- | 2+ | 2o | 1+ | 2+ | 2+ | 1323 | 2222 | 4 | 10 | 22 | 19 | 15 | 9 | 17 | 20 | 15 |
| 20 | 2- | 3- | 3- | 2+ | 3o | 4o | 3+ | 2+ | 3312 | 1232 | 13 | 23 | 26 | 20 | 33 | 53 | 39 | 20 | 28 |
| 21 | 2- | 1+ | 2- | 3- | 3- | 1+ | 2+ | 3- | 2212 | 1232 | 11 | 9 | 13 | 22 | 26 | 10 | 20 | 23 | 17 |
| 22 | 2- | 1+ | 2- | 2- | 2+ | 3- | 3o | 2+ | 2321 | 4222 | 11 | 9 | 12 | 12 | 18 | 23 | 32 | 18 | 17 |
| 23 | 1+ | 2o | 1+ | 2+ | 2+ | 2- | 2- | 3- | 2222 | 2422 | 10 | 14 | 10 | 20 | 20 | 13 | 13 | 23 | 15 |
| 24 | 2- | 2o | 1+ | 1+ | 2- | 2- | 2- | 1+ | 2521 | 3212 | 12 | 16 | 10 | 8 | 11 | 11 | 13 | 8 | 11 |
| 25 | 1- | 2- | 2- | 2- | 1+ | 2o | 2- | 2o | 3323 | 2422 | 4 | 13 | 12 | 13 | 10 | 16 | 11 | 15 | 12 |
| 26 | 2o | 2+ | 2+ | 2- | 2- | 1+ | 1+ | 1- | 2221 | 2431 | 15 | 17 | 18 | 13 | 11 | 10 | 9 | 4 | 12 |
| 27 | 1o | 2- | 2o | 3o | 2+ | 0o | 1- | 1+ | 3223 | 2122 | 6 | 13 | 16 | 27 | 19 | 1 | 4 | 10 | 12 |
| 28 | 1+ | 2o | 2+ | 2- | 2o | 3o | 3o | 3o | 2332 | 1435 | 8 | 15 | 19 | 11 | 14 | 27 | 29 | 33 | 20 |
| 29 | 4- | 3- | 1+ | 1o | 1+ | 1o | 0+ | 2- | 4222 | 2223 | 47 | 22 | 10 | 7 | 10 | 7 | 3 | 11 | 15 |
| 30 | 1+ | 0+ | 0o | 0+ | 1+ | 2- | 1o | 2- | 2212 | 2212 | 9 | 2 | 1 | 2 | 9 | 12 | 7 | 12 | 7 |
| 31 | 3- | 2- | 1o | 1+ | 1+ | 1o | 1o | 1+ | 4431 | 3212 | 21 | 11 | 6 | 8 | 9 | 7 | 6 | 8 | 10 |
| | | | | | | | | | | | Monthly mean value of As | | | | | | | | 13.0 |

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| | Kn | | | | | | | | σn | | an | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 2+ | 1o | 1o | 2+ | 2+ | 1+ | 2- | 3422 | 3512 | 15 | 18 | 7 | 7 | 18 | 19 | 10 | 13 | 13 |
| 2 | 1+ | 1o | 1o | 1o | 1+ | 2+ | 1+ | 1o | 1632 | 2414 | 8 | 6 | 7 | 6 | 9 | 17 | 8 | 7 | 9 |
| 3 | 1+ | 1o | 2- | 1+ | 1- | 0+ | 1- | 1- | 2133 | 2211 | 9 | 7 | 13 | 9 | 5 | 3 | 5 | 4 | 7 |
| 4 | 1- | 0+ | 0+ | 1o | 1+ | 3- | 2+ | 0+ | 2222 | 2332 | 4 | 3 | 3 | 6 | 10 | 23 | 17 | 3 | 9 |
| 5 | 0+ | 0+ | 1o | 2- | 1o | 2- | 0+ | 2- | 2212 | 1221 | 3 | 2 | 7 | 12 | 6 | 12 | 3 | 12 | 7 |
| 6 | 2+ | 1+ | 1- | 1+ | 2+ | 2- | 1+ | 3- | 3222 | 3313 | 20 | 8 | 4 | 9 | 19 | 12 | 8 | 24 | 13 |
| 7 | 2o | 1+ | 1+ | 2- | 3- | 3- | 2o | 3o | 1324 | 3333 | 15 | 9 | 10 | 13 | 21 | 23 | 16 | 27 | 17 |
| 8 | 2o | 3- | 3o | 2- | 3- | 4o | 3+ | 2o | 2441 | 4442 | 14 | 26 | 33 | 13 | 23 | 58 | 38 | 16 | 28 |
| 9 | 2- | 2- | 1+ | 3+ | 3+ | 3- | 1o | 3o | 2224 | 4323 | 13 | 13 | 10 | 39 | 34 | 24 | 6 | 30 | 21 |
| 10 | 3- | 2o | 1+ | 3- | 2o | 3- | 2- | 1+ | 3423 | 2413 | 21 | 16 | 10 | 23 | 14 | 23 | 11 | 8 | 16 |
| 11 | 2- | 1o | 1- | 0+ | 1o | 2- | 3+ | 2- | 2222 | 2341 | 13 | 6 | 4 | 2 | 7 | 11 | 40 | 13 | 12 |
| 12 | 3o | 3- | 3o | 3- | 4+ | 4+ | 2+ | 2- | 4244 | 5441 | 32 | 22 | 33 | 26 | 69 | 62 | 20 | 13 | 35 |
| 13 | 2o | 2- | 1o | 0o | 1o | 1- | 1+ | 1+ | 2410 | 1121 | 16 | 12 | 6 | 0 | 7 | 4 | 10 | 9 | 8 |
| 14 | 1o | 1+ | 2- | 2o | 1+ | 2- | 1o | 1- | 3332 | 2132 | 7 | 10 | 11 | 14 | 10 | 13 | 7 | 4 | 10 |
| 15 | 0+ | 1o | 1o | 2- | 3- | 2- | 2- | 2o | 2232 | 3222 | 3 | 7 | 6 | 11 | 26 | 11 | 12 | 16 | 12 |
| 16 | 2o | 1+ | 2+ | 3o | 3o | 3+ | 3+ | 2- | 1344 | 3162 | 15 | 10 | 20 | 28 | 33 | 34 | 36 | 13 | 24 |
| 17 | 1o | 2- | 1+ | 1+ | 3- | 3o | 3o | 2+ | 2222 | 3234 | 7 | 12 | 10 | 9 | 23 | 30 | 30 | 20 | 18 |
| 18 | 1+ | 1+ | 1+ | 3- | 2o | 1+ | 1+ | 2+ | 3325 | 2233 | 10 | 10 | 9 | 24 | 14 | 8 | 10 | 20 | 13 |
| 19 | 1+ | 1- | 1- | 1o | 1+ | 2- | 2- | 2+ | 1212 | 1122 | 8 | 5 | 5 | 6 | 8 | 13 | 13 | 20 | 10 |
| 20 | 2o | 4- | 3+ | 5- | 5- | 4+ | 4- | 3o | 2312 | 2332 | 14 | 46 | 34 | 73 | 71 | 64 | 47 | 31 | 48 |
| 21 | 3- | 3- | 4o | 3o | 2- | 4o | 3- | 3o | 2434 | 2533 | 24 | 22 | 51 | 31 | 11 | 51 | 25 | 31 | 31 |
| 22 | 2- | 4- | 4- | 4- | 3- | 2o | 2+ | 4- | 2453 | 3122 | 13 | 47 | 42 | 45 | 23 | 14 | 17 | 43 | 31 |
| 23 | 2+ | 2o | 2o | 3- | 4- | 3- | 3o | 2- | 2113 | 2233 | 18 | 16 | 15 | 26 | 42 | 24 | 27 | 13 | 23 |
| 24 | 2o | 1+ | 2- | 3- | 3- | 3- | 4o | 3+ | 3024 | 3335 | 14 | 9 | 12 | 21 | 21 | 22 | 51 | 36 | 23 |
| 25 | 2+ | 1o | 1+ | 3- | 2- | 2o | 3- | 1+ | 3123 | 2221 | 17 | 7 | 10 | 23 | 11 | 14 | 22 | 8 | 14 |
| 26 | 1+ | 0+ | 1o | 3- | 2+ | 2- | 1o | 1o | 1113 | 3132 | 8 | 3 | 7 | 23 | 18 | 12 | 7 | 7 | 11 |
| 27 | 1- | 1+ | 3- | 2+ | 2+ | 3+ | 4- | 3+ | 2131 | 2252 | 4 | 8 | 23 | 17 | 18 | 39 | 45 | 35 | 24 |
| 28 | 2- | 2o | 2+ | 4- | 3- | 2o | 3- | 3+ | 2323 | 4132 | 12 | 14 | 17 | 43 | 25 | 15 | 22 | 34 | 23 |
| | | | | | | | | | | | Monthly mean value of An | | | | | | | | 18.2 |

**FEBRUARY 1987**

| | Ks | | | | | | | | σs | | as | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 1+ | 1o | 1+ | 2o | 2o | 1+ | 2- | 3422 | 3241 | 16 | 9 | 7 | 10 | 15 | 14 | 9 | 12 | 12 |
| 2 | 1+ | 0+ | 0+ | 1+ | 1+ | 2- | 1- | 1- | 1221 | 4223 | 9 | 3 | 3 | 10 | 10 | 13 | 5 | 4 | 7 |
| 3 | 1+ | 1+ | 2- | 1+ | 0+ | 0+ | 1- | 1+ | 2142 | 2223 | 10 | 9 | 12 | 9 | 3 | 3 | 5 | 8 | 7 |
| 4 | 1o | 1- | 0+ | 1o | 2- | 2o | 2+ | 0+ | 2323 | 2042 | 6 | 5 | 3 | 6 | 11 | 16 | 17 | 3 | 8 |
| 5 | 1o | 1- | 1o | 2o | 1o | 2o | 1o | 2- | 3231 | 3122 | 7 | 5 | 7 | 15 | 7 | 14 | 6 | 13 | 9 |
| 6 | 3- | 2- | 1- | 2o | 2o | 1+ | 1+ | 3- | 3222 | 2233 | 21 | 13 | 4 | 16 | 16 | 10 | 10 | 22 | 14 |
| 7 | 2- | 1o | 1+ | 1+ | 2+ | 2+ | 2- | 3o | 2232 | 2323 | 12 | 7 | 9 | 8 | 17 | 17 | 13 | 33 | 15 |
| 8 | 2+ | 3- | 3- | 2- | 2+ | 4- | 3+ | 2o | 1332 | 2233 | 17 | 25 | 25 | 11 | 17 | 44 | 34 | 16 | 24 |
| 9 | 2- | 2- | 1+ | 2+ | 2+ | 2+ | 1+ | 3- | 2214 | 4132 | 13 | 11 | 9 | 19 | 19 | 20 | 8 | 25 | 16 |
| 10 | 2o | 2- | 1+ | 2o | 2- | 2- | 1o | 1o | 3222 | 3331 | 16 | 11 | 10 | 16 | 11 | 13 | 7 | 6 | 11 |
| 11 | 2+ | 1+ | 1+ | 0+ | 1o | 1+ | 3o | 2o | 3431 | 2331 | 17 | 9 | 9 | 2 | 7 | 8 | 32 | 14 | 12 |
| 12 | 3+ | 2+ | 2+ | 2+ | 4o | 4- | 2- | 1+ | 3432 | 4212 | 35 | 20 | 17 | 18 | 54 | 42 | 12 | 10 | 26 |
| 13 | 2- | 1+ | 1+ | 0o | 1o | 0+ | 1+ | 1o | 2240 | 1230 | 13 | 9 | 8 | 0 | 7 | 2 | 8 | 7 | 7 |
| 14 | 2- | 2- | 2- | 2- | 1o | 1+ | 0+ | 1- | 3322 | 3212 | 12 | 12 | 13 | 13 | 6 | 9 | 2 | 4 | 9 |
| 15 | 0+ | 1o | 0+ | 1+ | 3- | 1+ | 1+ | 2- | 1323 | 3111 | 2 | 6 | 3 | 9 | 24 | 8 | 10 | 13 | 9 |
| 16 | 2- | 1+ | 2- | 3o | 3+ | 3o | 3- | 2- | 2243 | 3052 | 11 | 8 | 13 | 31 | 37 | 32 | 25 | 11 | 21 |
| 17 | 1o | 2- | 1+ | 1+ | 2o | 2+ | 3- | 3- | 3222 | 1232 | 6 | 11 | 9 | 9 | 14 | 18 | 21 | 22 | 14 |
| 18 | 2- | 1+ | 1- | 2o | 1+ | 1o | 1o | 2+ | 2323 | 2223 | 12 | 9 | 5 | 15 | 9 | 6 | 6 | 19 | 10 |
| 19 | 1+ | 0+ | 0+ | 1- | 1o | 1+ | 1+ | 2+ | 4223 | 1222 | 8 | 3 | 3 | 4 | 6 | 8 | 8 | 18 | 7 |
| 20 | 2+ | 4- | 3+ | 5- | 4o | 4+ | 3+ | 3o | 2321 | 2113 | 18 | 48 | 37 | 73 | 54 | 62 | 36 | 27 | 44 |
| 21 | 2+ | 2o | 3o | 3- | 1+ | 3+ | 2+ | 3o | 1423 | 2243 | 18 | 14 | 33 | 25 | 8 | 35 | 17 | 30 | 23 |
| 22 | 2- | 3o | 3o | 4- | 2o | 2- | 2- | 4- | 3212 | 2423 | 13 | 33 | 30 | 41 | 14 | 11 | 12 | 46 | 25 |
| 23 | 2+ | 2+ | 2- | 2+ | 3+ | 2+ | 3o | 2- | 2231 | 2112 | 17 | 18 | 12 | 19 | 35 | 18 | 29 | 13 | 20 |
| 24 | 1+ | 1+ | 1+ | 2o | 2+ | 2+ | 3+ | 3- | 2112 | 5144 | 10 | 8 | 9 | 15 | 18 | 17 | 39 | 26 | 18 |
| 25 | 2o | 1o | 1+ | 2o | 1+ | 1+ | 2o | 1o | 0115 | 1233 | 16 | 6 | 8 | 15 | 8 | 9 | 14 | 6 | 10 |
| 26 | 1o | 0o | 1- | 2+ | 2- | 1o | 1- | 1- | 3123 | 2222 | 7 | 1 | 5 | 18 | 13 | 7 | 4 | 4 | 7 |
| 27 | 1o | 2- | 3o | 3- | 2o | 3o | 3+ | 3- | 1342 | 0232 | 6 | 11 | 27 | 21 | 16 | 28 | 35 | 22 | 21 |
| 28 | 2- | 2- | 2+ | 4- | 3- | 1+ | 2+ | 3o | 4412 | 1244 | 12 | 11 | 17 | 45 | 21 | 10 | 17 | 33 | 21 |
| | | | | | | | | | | | Monthly mean value of As | | | | | | | | 15.3 |

**MARCH 1987**

| | Kn | | | | | | | | σn | | an | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 2- | 1+ | 1+ | 2o | 3- | 3+ | 2+ | 0131 | 3331 | 14 | 13 | 9 | 9 | 14 | 26 | 36 | 19 | 18 |
| 2 | 0o | 0+ | 1+ | 1- | 1+ | 2- | 1o | 2- | 2241 | 2122 | 1 | 2 | 8 | 5 | 9 | 11 | 7 | 11 | 7 |
| 3 | 1- | 2o | 2o | 2o | 1+ | 2- | 2+ | 2+ | 2432 | 1333 | 4 | 14 | 14 | 14 | 8 | 13 | 20 | 17 | 13 |
| 4 | 3o | 2- | 1+ | 3- | 3- | 2o | 2o | 3- | 3323 | 2235 | 33 | 11 | 8 | 25 | 23 | 16 | 16 | 22 | 19 |
| 5 | 1+ | 3o | 2o | 4- | 4+ | 4o | 3o | 4o | 1124 | 5432 | 9 | 29 | 14 | 46 | 69 | 59 | 31 | 56 | 39 |
| 6 | 2+ | 2- | 2+ | 2o | 2- | 1o | 3- | 3o | 4243 | 2143 | 18 | 13 | 18 | 16 | 11 | 7 | 22 | 31 | 17 |
| 7 | 4- | 3o | 4o | 3+ | 4o | 2- | 2+ | 1+ | 3335 | 2243 | 46 | 32 | 52 | 40 | 58 | 12 | 17 | 10 | 33 |
| 8 | 3- | 2+ | 3o | 3- | 3o | 3o | 2- | 2o | 5421 | 5333 | 25 | 18 | 28 | 24 | 29 | 33 | 12 | 14 | 23 |
| 9 | 3- | 3o | 2o | 1+ | 1o | 2- | 1+ | 1o | 3423 | 1213 | 25 | 28 | 15 | 8 | 7 | 12 | 8 | 6 | 14 |
| 10 | 1+ | 2o | 3o | 2+ | 4o | 3+ | 1o | 0+ | 3122 | 2332 | 8 | 15 | 27 | 18 | 56 | 36 | 7 | 2 | 21 |
| 11 | 1+ | 1+ | 2o | 2o | 3o | 3o | 3+ | 1+ | 3121 | 3562 | 8 | 8 | 14 | 15 | 29 | 32 | 35 | 10 | 19 |
| 12 | 2+ | 2+ | 2+ | 3+ | 2o | 1+ | 3- | 4o | 4444 | 1232 | 20 | 19 | 18 | 39 | 14 | 10 | 26 | 53 | 25 |
| 13 | 3- | 2- | 2o | 2o | 2+ | 2- | 1+ | 2+ | 3101 | 3313 | 22 | 11 | 14 | 16 | 17 | 11 | 8 | 18 | 15 |
| 14 | 2- | 2+ | 2- | 3- | 2o | 2o | 2+ | 2- | 1214 | 1032 | 13 | 18 | 11 | 22 | 16 | 14 | 18 | 13 | 16 |
| 15 | 2- | 3o | 2o | 3- | 2+ | 1+ | 2- | 2+ | 2422 | 3132 | 11 | 28 | 16 | 22 | 19 | 10 | 11 | 18 | 17 |
| 16 | 2+ | 1o | 3- | 3o | 3+ | 1+ | 3- | 3- | 3333 | 3235 | 18 | 7 | 26 | 28 | 34 | 9 | 22 | 23 | 21 |
| 17 | 3- | 3+ | 2+ | 2- | 2o | 2o | 1+ | 1+ | 3522 | 2232 | 22 | 37 | 19 | 11 | 16 | 14 | 10 | 8 | 17 |
| 18 | 2o | 1o | 2o | 1+ | 3- | 3+ | 3o | 4o | 5221 | 2313 | 15 | 7 | 15 | 8 | 21 | 38 | 31 | 53 | 24 |
| 19 | 3+ | 3- | 2o | 3- | 2+ | 1+ | 2+ | 3- | 3223 | 4255 | 37 | 25 | 16 | 23 | 20 | 9 | 20 | 21 | 21 |
| 20 | 1- | 0+ | 1- | 1- | 1+ | 1+ | 1+ | 2- | 2122 | 3232 | 5 | 2 | 5 | 5 | 10 | 10 | 8 | 11 | 7 |
| 21 | 1+ | 1+ | 2o | 3- | 4- | 4o | 4- | 4o | 2242 | 2113 | 8 | 8 | 16 | 25 | 45 | 53 | 41 | 54 | 31 |
| 22 | 4o | 2o | 2+ | 3- | 2- | 2+ | 4- | 3+ | 4133 | 1223 | 53 | 14 | 17 | 21 | 12 | 20 | 44 | 38 | 27 |
| 23 | 1+ | 1+ | 2o | 2+ | 2+ | 1+ | 1+ | 0+ | 2332 | 2222 | 9 | 8 | 15 | 20 | 17 | 10 | 8 | 3 | 11 |
| 24 | 1o | 0+ | 3- | 1+ | 1- | 1o | 2- | 2- | 1222 | 2212 | 6 | 2 | 21 | 8 | 5 | 6 | 12 | 11 | 9 |
| 25 | 1- | 0o | 1- | 1- | 1+ | 3+ | 2- | 3- | 2122 | 2322 | 4 | 1 | 5 | 5 | 9 | 38 | 13 | 23 | 12 |
| 26 | 2+ | 2+ | 3o | 3o | 3- | 3o | 2+ | 1+ | 4322 | 1331 | 17 | 17 | 28 | 32 | 24 | 29 | 20 | 9 | 22 |
| 27 | 2+ | 3- | 3o | 4+ | 4o | 4o | 3o | 3o | 3322 | 2324 | 19 | 26 | 29 | 63 | 57 | 51 | 27 | 29 | 38 |
| 28 | 4- | 3- | 3o | 2+ | 2+ | 2- | 2- | 1o | 3233 | 2112 | 48 | 24 | 32 | 19 | 17 | 11 | 11 | 6 | 21 |
| 29 | 1- | 1o | 3- | 2o | 1- | 1o | 1+ | 1+ | 2031 | 2022 | 4 | 6 | 24 | 16 | 5 | 6 | 10 | 8 | 10 |
| 30 | 1- | 1o | 1o | 1o | 2o | 2- | 1+ | 0+ | 2110 | 3232 | 5 | 6 | 6 | 6 | 14 | 11 | 10 | 3 | 8 |
| 31 | 1- | 2- | 1+ | 1+ | 2- | 1+ | 1+ | 1o | 3343 | 2342 | 4 | 11 | 8 | 8 | 12 | 8 | 10 | 6 | 8 |
| | | | | | | | | | | | | | | | Monthly mean value of An | | | | 18.8 |

**MARCH 1987**

| | Ks | | | | | | | | σs | | as | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 3- | 1+ | 1+ | 1o | 3- | 3o | 2o | 3331 | 2133 | 16 | 21 | 9 | 9 | 6 | 24 | 31 | 15 | 16 |
| 2 | 0o | 0+ | 1o | 1- | 1o | 1o | 0+ | 1o | 1112 | 3221 | 1 | 2 | 6 | 4 | 6 | 7 | 3 | 6 | 4 |
| 3 | 0+ | 2- | 1+ | 1+ | 1o | 2- | 2+ | 2o | 2343 | 2353 | 2 | 12 | 9 | 9 | 6 | 12 | 19 | 15 | 11 |
| 4 | 3o | 1+ | 1+ | 2+ | 2+ | 2- | 2- | 2+ | 1233 | 3223 | 29 | 8 | 10 | 20 | 19 | 13 | 13 | 19 | 16 |
| 5 | 1+ | 3o | 2- | 3+ | 4o | 4- | 3- | 4- | 2323 | 5223 | 9 | 27 | 13 | 37 | 55 | 46 | 24 | 48 | 32 |
| 6 | 2o | 1+ | 1+ | 2o | 1o | 0+ | 2+ | 3o | 4133 | 2253 | 16 | 9 | 9 | 14 | 6 | 3 | 20 | 28 | 13 |
| 7 | 4- | 3- | 4- | 4- | 4- | 1- | 2- | 1+ | 6343 | 2233 | 50 | 25 | 45 | 42 | 48 | 4 | 13 | 8 | 29 |
| 8 | 2+ | 1+ | 3o | 3- | 3- | 3- | 1+ | 1+ | 4333 | 4112 | 17 | 8 | 31 | 25 | 21 | 24 | 8 | 10 | 18 |
| 9 | 3- | 3- | 2- | 0+ | 1- | 1o | 1o | 1- | 5341 | 1121 | 22 | 23 | 11 | 2 | 5 | 6 | 7 | 5 | 10 |
| 10 | 1- | 2- | 3- | 2o | 4- | 3- | 1o | 0o | 2322 | 3230 | 5 | 12 | 22 | 14 | 42 | 25 | 6 | 0 | 16 |
| 11 | 1+ | 1+ | 2- | 2o | 3- | 3- | 2+ | 1+ | 4221 | 2231 | 8 | 9 | 12 | 15 | 21 | 26 | 20 | 8 | 15 |
| 12 | 2o | 2+ | 2- | 3- | 1+ | 1o | 2o | 4- | 2222 | 1132 | 15 | 17 | 13 | 22 | 10 | 6 | 16 | 46 | 18 |
| 13 | 3- | 2- | 2o | 2- | 1+ | 1- | 1o | 2- | 2412 | 3213 | 23 | 12 | 14 | 11 | 10 | 5 | 6 | 13 | 12 |
| 14 | 2- | 3- | 1+ | 2- | 1+ | 1+ | 2o | 1o | 3512 | 1332 | 13 | 21 | 10 | 11 | 8 | 9 | 14 | 7 | 12 |
| 15 | 2- | 3- | 2- | 2+ | 2o | 1+ | 1+ | 2+ | 2332 | 5223 | 12 | 21 | 12 | 17 | 15 | 8 | 9 | 17 | 14 |
| 16 | 3- | 1- | 2o | 2+ | 3+ | 1+ | 2o | 2- | 4133 | 3252 | 23 | 4 | 16 | 20 | 39 | 8 | 16 | 13 | 17 |
| 17 | 3- | 3- | 2o | 1+ | 2- | 1+ | 0+ | 0+ | 5322 | 2322 | 22 | 25 | 16 | 9 | 12 | 8 | 3 | 3 | 12 |
| 18 | 2o | 1+ | 2- | 1o | 2o | 3- | 3- | 4- | 3142 | 0225 | 14 | 8 | 11 | 6 | 16 | 26 | 21 | 47 | 19 |
| 19 | 3o | 3- | 2o | 3- | 2o | 1o | 2- | 2o | 5512 | 3364 | 32 | 23 | 15 | 21 | 14 | 7 | 11 | 16 | 17 |
| 20 | 1- | 0o | 0+ | 0+ | 1o | 1o | 0+ | 1+ | 2121 | 3321 | 5 | 1 | 3 | 2 | 6 | 6 | 3 | 8 | 4 |
| 21 | 1o | 1+ | 1+ | 3- | 3+ | 4o | 3+ | 4o | 1133 | 1233 | 7 | 9 | 9 | 22 | 34 | 56 | 35 | 51 | 28 |
| 22 | 4o | 2- | 1+ | 2- | 1o | 2- | 4- | 4- | 5232 | 2426 | 57 | 12 | 10 | 12 | 7 | 13 | 43 | 42 | 25 |
| 23 | 2- | 1+ | 2- | 2+ | 2- | 1o | 0+ | 0o | 2421 | 3311 | 12 | 8 | 13 | 18 | 12 | 6 | 2 | 1 | 9 |
| 24 | 1o | 0o | 2+ | 1- | 0o | 0+ | 1o | 1- | 1033 | 0122 | 6 | 0 | 20 | 4 | 0 | 2 | 7 | 5 | 6 |
| 25 | 1- | 0o | 0o | 0o | 0+ | 3o | 1+ | 2o | 2111 | 2313 | 4 | 1 | 1 | 1 | 3 | 29 | 8 | 16 | 8 |
| 26 | 3- | 2o | 3- | 3o | 2+ | 3- | 2o | 1o | 3320 | 1321 | 22 | 15 | 26 | 32 | 17 | 23 | 14 | 6 | 19 |
| 27 | 3- | 3- | 3- | 4o | 4o | 4- | 3- | 3- | 5342 | 1222 | 23 | 23 | 22 | 54 | 51 | 48 | 21 | 21 | 33 |
| 28 | 4o | 3o | 3- | 2- | 2- | 1o | 1o | 0+ | 4323 | 3020 | 54 | 27 | 22 | 13 | 13 | 7 | 7 | 3 | 18 |
| 29 | 0+ | 1+ | 2+ | 1+ | 0o | 0+ | 1o | 1- | 2143 | 0212 | 3 | 8 | 17 | 10 | 0 | 3 | 6 | 4 | 6 |
| 30 | 1- | 1- | 0o | 1- | 2- | 1+ | 1o | 0+ | 4211 | 3313 | 4 | 4 | 1 | 5 | 11 | 8 | 7 | 2 | 5 |
| 31 | 1+ | 1+ | 1o | 1o | 1+ | 0+ | 0+ | 1- | 4344 | 2122 | 8 | 10 | 6 | 6 | 8 | 2 | 3 | 4 | 6 |
| | | | | | | | | | | | | | | | Monthly mean value of As | | | | 15.1 |

**APRIL 1987**

| | Kn | | | | | | | | σn | | an | | | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2+ | 3- | 3o | 2+ | 2- | 2- | 2+ | 1o | 2245 | 1333 | 20 | 24 | 27 | 20 | 13 | 13 | 17 | 7 | 18 |
| 2 | 1o | 2- | 1+ | 2o | 1+ | 2- | 1o | 1- | 4223 | 3213 | 6 | 11 | 10 | 14 | 9 | 12 | 6 | 4 | 9 |
| 3 | 0+ | 0+ | 0+ | 1- | 0+ | 0+ | 1- | 0+ | 3222 | 2333 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 3 | 3 |
| 4 | 0+ | 3+ | 2+ | 4- | 4+ | 3o | 2- | 2- | 1224 | 3423 | 3 | 40 | 18 | 48 | 69 | 31 | 11 | 13 | 29 |
| 5 | 3- | 3o | 2o | 1+ | 3o | 3o | 3- | 2+ | 2332 | 1133 | 21 | 33 | 16 | 10 | 28 | 32 | 25 | 20 | 23 |
| 6 | 1+ | 2o | 1- | 2- | 2+ | 2o | 1+ | 2- | 2521 | 2122 | 9 | 16 | 4 | 13 | 19 | 15 | 9 | 11 | 12 |
| 7 | 3o | 3+ | 3+ | 2+ | 2+ | 3+ | 2- | 1o | 5432 | 2322 | 28 | 37 | 36 | 17 | 20 | 34 | 13 | 6 | 24 |
| 8 | 1- | 1+ | 3- | 3- | 2+ | 2o | 3+ | 3- | 2123 | 2123 | 5 | 10 | 26 | 24 | 17 | 15 | 39 | 23 | 20 |
| 9 | 1+ | 1+ | 1+ | 3- | 3- | 2o | 3+ | 2o | 3323 | 2222 | 10 | 10 | 10 | 22 | 24 | 16 | 35 | 16 | 18 |
| 10 | 4- | 3+ | 2o | 2- | 1o | 1o | 1o | 0o | 5532 | 3222 | 46 | 36 | 16 | 13 | 6 | 7 | 7 | 1 | 17 |
| 11 | 1o | 2+ | 2+ | 2o | 3- | 2- | 1+ | 2o | 2431 | 2311 | 7 | 18 | 20 | 15 | 22 | 12 | 8 | 15 | 15 |
| 12 | 1+ | 2o | 1- | 1o | 2- | 1o | 1- | 2o | 2421 | 3123 | 9 | 15 | 5 | 7 | 11 | 7 | 5 | 15 | 9 |
| 13 | 2- | 1+ | 2o | 3- | 1o | 4o | 3+ | 3o | 2252 | 1325 | 13 | 9 | 16 | 24 | 7 | 53 | 35 | 31 | 24 |
| 14 | 1- | 1o | 1+ | 2o | 3o | 2+ | 2o | 1+ | 1022 | 2222 | 4 | 6 | 10 | 16 | 32 | 18 | 15 | 10 | 14 |
| 15 | 2o | 1+ | 1+ | 1+ | 2o | 2o | 2+ | 2- | 3322 | 1112 | 14 | 8 | 8 | 8 | 15 | 15 | 18 | 12 | 12 |
| 16 | 1- | 1+ | 2- | 1+ | 1+ | 1+ | 0+ | 1+ | 3231 | 2321 | 5 | 9 | 11 | 8 | 10 | 10 | 3 | 9 | 8 |
| 17 | 2o | 1o | 1o | 1o | 2- | 2- | 1+ | 1- | 2221 | 3221 | 15 | 6 | 6 | 6 | 11 | 13 | 10 | 5 | 9 |
| 18 | 1- | 1o | 1o | 2- | 1+ | 1+ | 2- | 2- | 2212 | 2122 | 5 | 7 | 7 | 11 | 10 | 8 | 11 | 11 | 9 |
| 19 | 1+ | 3- | 3o | 3- | 2- | 2- | 2o | 2- | 2334 | 2224 | 10 | 24 | 33 | 26 | 11 | 11 | 14 | 11 | 18 |
| 20 | 1+ | 3+ | 3+ | 4o | 2o | 1+ | 1- | 1- | 2323 | 1231 | 8 | 35 | 39 | 52 | 15 | 10 | 4 | 4 | 21 |
| 21 | 1- | 2- | 2o | 1+ | 1- | 0+ | 0+ | 0o | 2203 | 1221 | 4 | 12 | 14 | 10 | 4 | 3 | 2 | 1 | 6 |
| 22 | 0+ | 2- | 2- | 1+ | 1+ | 1+ | 2- | 2o | 2233 | 2222 | 2 | 11 | 11 | 9 | 10 | 10 | 13 | 16 | 10 |
| 23 | 1o | 2- | 1- | 1o | 1o | 1o | 1+ | 1+ | 1410 | 0212 | 7 | 13 | 5 | 6 | 6 | 6 | 8 | 10 | 8 |
| 24 | 2- | 2+ | 2+ | 3o | 3o | 1+ | 3- | 2- | 2235 | 1243 | 13 | 18 | 17 | 32 | 30 | 8 | 21 | 13 | 19 |
| 25 | 1o | 1+ | 2- | 2- | 1+ | 2- | 1+ | 1+ | 2332 | 1223 | 6 | 8 | 11 | 11 | 9 | 13 | 10 | 9 | 10 |
| 26 | 1+ | 1+ | 0+ | 1+ | 2o | 1+ | 1+ | 1o | 1232 | 0220 | 10 | 9 | 3 | 8 | 14 | 10 | 10 | 6 | 9 |
| 27 | 1+ | 2- | 3o | 3+ | 2+ | 3o | 2o | 2o | 2215 | 3231 | 8 | 11 | 27 | 36 | 18 | 31 | 16 | 15 | 20 |
| 28 | 1+ | 1- | 0+ | 1- | 1- | 0+ | 1- | 1+ | 3331 | 2233 | 8 | 4 | 3 | 4 | 5 | 3 | 4 | 8 | 5 |
| 29 | 1o | 1o | 1o | 1+ | 1- | 1o | 2+ | 1+ | 3221 | 1223 | 7 | 6 | 6 | 9 | 5 | 7 | 20 | 9 | 9 |
| 30 | 1- | 1o | 1o | 1o | 1+ | 1+ | 2- | 2o | 2213 | 2221 | 4 | 7 | 7 | 7 | 9 | 9 | 12 | 14 | 9 |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Monthly mean value of An | | | | 13.9 |

**APRIL 1987**

| | Ks | | | | | | | | σs | | as | | | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2+ | 3+ | 3o | 2+ | 2- | 2- | 2- | 0o | 3564 | 3221 | 20 | 34 | 29 | 19 | 11 | 12 | 11 | 1 | 17 |
| 2 | 0+ | 1+ | 1o | 1+ | 1- | 1+ | 0+ | 0o | 4535 | 3220 | 3 | 9 | 6 | 10 | 5 | 10 | 3 | 0 | 6 |
| 3 | 0o | 0o | 0o | 0o | 0o | 0o | 0o | 0o | 0112 | 0000 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0o | 4- | 3- | 4- | 4o | 3o | 1o | 1+ | 3322 | 5532 | 1 | 43 | 21 | 45 | 51 | 33 | 6 | 8 | 26 |
| 5 | 3- | 3+ | 2o | 1o | 2o | 2+ | 3- | 2+ | 3531 | 1123 | 26 | 34 | 14 | 6 | 14 | 18 | 21 | 18 | 19 |
| 6 | 1o | 2o | 0+ | 1+ | 2o | 1+ | 1- | 1+ | 3422 | 3221 | 7 | 14 | 3 | 10 | 15 | 9 | 4 | 8 | 9 |
| 7 | 3o | 3o | 3+ | 2o | 2o | 3o | 2- | 0+ | 7452 | 3132 | 27 | 31 | 35 | 15 | 16 | 27 | 13 | 3 | 21 |
| 8 | 1o | 1o | 2+ | 2+ | 1+ | 1+ | 3+ | 2+ | 1223 | 2112 | 6 | 7 | 19 | 18 | 8 | 10 | 36 | 19 | 15 |
| 9 | 1+ | 1+ | 1o | 2- | 2- | 1+ | 3o | 1+ | 4412 | 2122 | 8 | 9 | 6 | 11 | 13 | 10 | 32 | 10 | 12 |
| 10 | 4- | 3o | 2- | 1o | 0o | 0+ | 0+ | 0o | 5544 | 0320 | 47 | 33 | 13 | 7 | 0 | 2 | 3 | 0 | 13 |
| 11 | 1- | 2o | 2o | 2- | 2+ | 1+ | 0+ | 1o | 2544 | 4133 | 4 | 16 | 14 | 11 | 20 | 8 | 2 | 7 | 10 |
| 12 | 1o | 1+ | 0+ | 1- | 1+ | 0o | 0+ | 1+ | 2523 | 4113 | 6 | 10 | 3 | 4 | 8 | 1 | 2 | 8 | 5 |
| 13 | 2- | 1o | 2- | 2o | 0o | 4- | 3- | 2+ | 2220 | 1233 | 11 | 7 | 12 | 16 | 1 | 44 | 26 | 20 | 17 |
| 14 | 0+ | 0+ | 1- | 1+ | 3o | 2- | 2o | 0+ | 1111 | 5321 | 2 | 2 | 5 | 8 | 31 | 11 | 15 | 2 | 10 |
| 15 | 2- | 0+ | 0o | 1- | 1+ | 2- | 2- | 1o | 4213 | 2331 | 12 | 3 | 1 | 4 | 9 | 12 | 12 | 6 | 7 |
| 16 | 0+ | 1+ | 1o | 1o | 0o | 0o | 0o | 1- | 3322 | 1102 | 2 | 8 | 6 | 6 | 1 | 1 | 0 | 4 | 4 |
| 17 | 2- | 1- | 0o | 0o | 1- | 1- | 0+ | 1- | 2210 | 2223 | 12 | 4 | 1 | 0 | 4 | 5 | 3 | 4 | 4 |
| 18 | 0o | 1- | 1- | 1o | 0+ | 0+ | 1- | 0+ | 1220 | 1222 | 1 | 4 | 4 | 7 | 2 | 2 | 5 | 2 | 3 |
| 19 | 1o | 2+ | 3+ | 4- | 1o | 0+ | 1+ | 1- | 1345 | 1122 | 6 | 18 | 38 | 42 | 6 | 2 | 8 | 5 | 16 |
| 20 | 1- | 3+ | 3+ | 4- | 2o | 1- | 0o | 0o | 3635 | 4401 | 4 | 40 | 38 | 42 | 15 | 4 | 0 | 1 | 18 |
| 21 | 0+ | 1+ | 2- | 0+ | 0o | 0o | 0o | 0o | 1322 | 0000 | 2 | 8 | 11 | 3 | 0 | 0 | 0 | 0 | 3 |
| 22 | 0o | 1+ | 0+ | 1- | 1- | 1- | 1+ | 1+ | 1321 | 3121 | 1 | 8 | 2 | 5 | 5 | 5 | 9 | 9 | 6 |
| 23 | 0+ | 2- | 0o | 0o | 0+ | 0o | 0o | 1o | 2711 | 3111 | 3 | 11 | 1 | 1 | 3 | 1 | 1 | 6 | 3 |
| 24 | 2o | 2+ | 2o | 3o | 3+ | 1- | 2+ | 1+ | 2356 | 2352 | 15 | 18 | 15 | 29 | 35 | 4 | 17 | 10 | 18 |
| 25 | 0+ | 0+ | 1o | 0+ | 0+ | 1- | 1- | 0+ | 1023 | 2332 | 2 | 3 | 7 | 3 | 2 | 5 | 5 | 3 | 4 |
| 26 | 1o | 1- | 0o | 0+ | 1+ | 0+ | 1- | 0o | 1502 | 3121 | 7 | 5 | 0 | 3 | 10 | 3 | 4 | 1 | 4 |
| 27 | 1- | 1+ | 2+ | 3o | 1+ | 3- | 2- | 2- | 2347 | 2222 | 4 | 10 | 17 | 27 | 9 | 26 | 11 | 13 | 15 |
| 28 | 1o | 0o | 0o | 0o | 0o | 0o | 0o | 0+ | 2001 | 0002 | 7 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 1 |
| 29 | 1- | 1o | 0+ | 1- | 0o | 0+ | 2o | 0o | 2211 | 0142 | 4 | 6 | 2 | 5 | 0 | 2 | 14 | 1 | 4 |
| 30 | 0o | 1o | 0+ | 0o | 0+ | 1o | 1o | 1+ | 0221 | 1322 | 0 | 7 | 2 | 1 | 2 | 7 | 7 | 8 | 4 |
| | | | | | | | | | | | | | | | Monthly mean value of As | | | | 9.8 |

**MAY 1987**

| | Kn | σn | an | An |
|---|---|---|---|---|
| 1 | 1- 0+ 2- 3o 2+ 2+ 3- 3- | 2124 3121 | 5 3 12 29 20 18 21 22 | 16 |
| 2 | 2o 1o 2o 2+ 1+ 2- 2- 2o | 2334 3323 | 14 6 14 17 8 11 11 16 | 12 |
| 3 | 1- 1o 3- 3- 3- 1+ 1+ 1o | 2114 2232 | 4 7 22 23 22 9 10 6 | 13 |
| 4 | 1o 2- 3- 2- 2- 1+ 1o 1+ | 1321 2211 | 7 13 24 12 12 10 7 8 | 12 |
| 5 | 1- 0+ 1- 2- 2o 2- 2- 1+ | 2111 1221 | 4 3 4 13 14 13 13 8 | 9 |
| 6 | 0+ 0+ 0o 0+ 2- 2o 2+ 3- | 2211 2332 | 2 3 1 2 12 14 20 22 | 10 |
| 7 | 3- 3o 2+ 2+ 2- 2- 1o 2- | 2022 2322 | 24 29 20 20 13 13 7 11 | 17 |
| 8 | 1+ 2- 1o 1+ 1o 1+ 1- 2- | 3322 3342 | 9 13 6 10 7 9 5 12 | 9 |
| 9 | 1+ 2- 2- 2+ 2- 1+ 1+ 1+ | 3233 3112 | 8 12 13 17 11 8 9 8 | 11 |
| 10 | 1+ 1+ 3- 3o 4- 2o 2o 1+ | 2322 2222 | 9 10 21 30 44 16 16 9 | 19 |
| 11 | 2- 1+ 1o 2- 1o 1+ 3- 3- | 2222 2243 | 11 8 7 11 6 10 22 24 | 12 |
| 12 | 1o 1- 0o 0+ 1- 1- 1- 1+ | 1111 2221 | 7 4 1 3 5 5 4 10 | 5 |
| 13 | 0+ 1o 2+ 2- 2o 2+ 2o 3o | 2223 4212 | 3 6 19 11 15 20 15 27 | 15 |
| 14 | 2+ 1+ 2o 3- 3o 2+ 2- 2+ | 4323 1212 | 18 10 15 22 31 17 13 18 | 18 |
| 15 | 0+ 1o 1+ 2o 2- 2- 1+ 1o | 2131 2322 | 3 7 10 14 12 12 8 6 | 9 |
| 16 | 1o 2- 1o 1+ 1+ 1+ 2- 1+ | 1123 2333 | 7 13 7 8 9 8 13 8 | 9 |
| 17 | 1o 1- 0o 1o 1+ 1+ 1+ 2- | 0111 2221 | 6 4 1 7 8 9 9 13 | 7 |
| 18 | 1+ 0+ 1o 1- 1o 1- 1o 1- | 2201 2232 | 8 3 6 5 6 4 7 5 | 6 |
| 19 | 1- 1- 0+ 0+ 1- 1+ 1- 1- | 3222 1232 | 4 4 2 3 5 8 4 5 | 4 |
| 20 | 2- 1o 1+ 1o 1+ 1+ 1+ 1+ | 2111 0222 | 13 6 10 7 9 9 8 10 | 9 |
| 21 | 1o 1- 0+ 1- 0+ 1o 1o 1- | 4222 2123 | 7 5 3 4 3 6 7 4 | 5 |
| 22 | 1+ 1+ 1+ 2- 2+ 3o 2o 2o | 3233 5312 | 8 9 8 13 20 31 15 15 | 15 |
| 23 | 2- 2o 2o 2o 2+ 2+ 2+ 3o | 2211 3323 | 13 14 14 15 17 17 20 30 | 18 |
| 24 | 2- 3o 3- 3+ 3- 4- 3+ 4+ | 2334 3422 | 13 33 21 35 21 50 40 61 | 34 |
| 25 | 3- 5- 4o 3o 4- 3- 3+ 2- | 2422 3333 | 25 81 59 33 48 21 34 12 | 39 |
| 26 | 1- 2o 3- 2+ 2+ 3- 4- 2o | 3121 3362 | 5 14 22 18 18 23 48 16 | 21 |
| 27 | 2+ 3o 3+ 4- 3- 2+ 3o 3- | 2223 4222 | 19 27 34 43 21 18 31 24 | 27 |
| 28 | 2+ 2o 2- 3- 2+ 1+ 3- 4- | 4134 1233 | 17 14 12 24 18 9 22 48 | 21 |
| 29 | 3+ 4+ 4+ 4+ 4- 2o 1+ 1- | 2535 2223 | 34 62 70 69 46 16 9 5 | 39 |
| 30 | 0+ 1- 2o 3o 3o 2+ 3o 2o | 2341 1212 | 3 5 16 28 32 19 32 14 | 19 |
| 31 | 2- 2- 3- 3o 2+ 3- 3+ 2+ | 1123 4341 | 12 13 22 28 20 21 34 18 | 21 |
| | | | Monthly mean value of An | 15.5 |

**MAY 1987**

| | Ks | σs | as | As |
|---|---|---|---|---|
| 1 | 1- 0o 2- 2+ 1+ 1+ 1+ 2+ | 3131 1134 | 4 1 11 17 9 9 9 17 | 10 |
| 2 | 1+ 0+ 2- 2- 1o 1- 1o 1o | 3145 2212 | 8 2 11 13 6 5 6 6 | 7 |
| 3 | 0+ 1- 2o 2+ 2- 1o 1+ 0o | 2245 3321 | 3 4 15 18 11 6 8 1 | 8 |
| 4 | 0+ 1+ 2+ 1- 1o 1- 1- 1- | 2352 2231 | 2 9 17 5 6 5 4 5 | 7 |
| 5 | 1- 0o 0o 1o 1o 1- 2- 0+ | 2122 2231 | 4 1 1 7 7 5 11 2 | 5 |
| 6 | 0o 0o 0o 0o 1o 1+ 2- 3- | 1100 1132 | 1 1 0 0 6 10 12 24 | 7 |
| 7 | 3- 3o 2- 2+ 2- 1o 1- 1+ | 3233 4323 | 22 31 13 19 12 7 4 9 | 15 |
| 8 | 1- 2o 0+ 1- 1- 1+ 0o 1o | 5512 2211 | 5 14 2 4 4 10 1 6 | 6 |
| 9 | 1- 1+ 1+ 1+ 0+ 0+ 0o 0o | 2231 0101 | 4 10 10 8 3 2 0 1 | 5 |
| 10 | 1- 1+ 2o 3o 4- 2- 1+ 1- | 2323 4332 | 5 8 16 31 41 11 8 4 | 16 |
| 11 | 1+ 1- 1- 0o 0o 0+ 3- 2+ | 3220 0233 | 8 5 4 0 0 2 23 19 | 8 |
| 12 | 0+ 0+ 0o 0o 0o 0o 0+ 1- | 1200 0021 | 2 2 0 0 0 0 2 5 | 1 |
| 13 | 1- 1- 2- 0+ 2- 1o 1+ 3- | 2221 2422 | 4 5 11 2 11 6 10 24 | 9 |
| 14 | 3- 1o 1+ 2- 3- 2- 1o 1+ | 6353 4222 | 26 6 10 13 21 13 7 10 | 13 |
| 15 | 0o 1- 1+ 1- 1o 1- 0o 0+ | 0221 1211 | 0 4 8 4 6 4 1 2 | 4 |
| 16 | 1- 1+ 1- 1- 0o 1- 1o 0+ | 2412 2230 | 5 9 5 5 1 5 6 3 | 5 |
| 17 | 1- 0o 0o 0o 0+ 0+ 0+ 1- | 2201 1201 | 5 1 0 1 2 3 3 5 | 3 |
| 18 | 0+ 0o 0+ 0o 0o 0o 0+ 0o | 1010 0020 | 2 0 2 0 0 0 2 0 | 1 |
| 19 | 0+ 0+ 0o 0o 0o 0o 0o 1- | 2110 0112 | 2 2 1 0 0 1 1 4 | 1 |
| 20 | 1+ 0+ 1- 0o 0o 1- 0o 1o | 1211 0212 | 8 2 5 1 0 4 1 6 | 3 |
| 21 | 1o 0+ 0o 0o 0o 0o 0+ 0o | 3101 0110 | 6 2 0 1 0 1 2 0 | 2 |
| 22 | 0+ 1o 1- 1o 1o 2- 2o 2o | 1541 1221 | 2 6 5 7 6 12 14 15 | 8 |
| 23 | 2- 1+ 1+ 1+ 1- 2- 2o 3o | 4323 2211 | 11 9 8 10 5 11 15 27 | 12 |
| 24 | 1+ 3+ 2o 4- 2o 4- 3+ 4+ | 2425 0343 | 9 37 16 43 16 46 35 61 | 33 |
| 25 | 3o 5- 4+ 4- 3o 2o 2o 0+ | 5453 2122 | 30 83 65 47 32 14 14 2 | 36 |
| 26 | 0o 1o 2o 2o 2o 3- 3+ 3- | 3035 3454 | 1 7 14 16 14 23 39 23 | 17 |
| 27 | 3- 3o 3+ 4- 3- 1+ 2+ 3- | 4343 4124 | 24 33 38 42 22 10 17 23 | 26 |
| 28 | 2- 1+ 1+ 2o 1o 0+ 2o 4o | 2430 2221 | 11 8 10 16 7 3 16 54 | 16 |
| 29 | 4- 5- 4o 4o 4- 2- 1- 0o | 4454 2111 | 41 74 59 59 41 12 4 1 | 36 |
| 30 | 0o 0o 2- 3- 3+ 2- 3- 2o | 1133 2233 | 1 1 11 25 34 11 25 15 | 15 |
| 31 | 1+ 2- 2+ 3o 2+ 2+ 4o 3- | 2445 4512 | 9 13 20 31 17 17 51 24 | 23 |
| | | | Monthly mean value of As | 11.5 |

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| | Kn | σn | an | | | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2+ 1+ 1+ 2- | 2+ 2- 2o 2+ | 7344 | 5435 | 17 | 10 | 9 | 12 | 18 | 12 | 15 | 18 | 14 |
| 2 | 3o 3- 2+ 2o | 1+ 2- 1+ 1+ | 6742 | 2242 | 29 | 22 | 20 | 15 | 10 | 12 | 10 | 9 | 16 |
| 3 | 0+ 1+ 1o 2- | 1+ 1+ 2+ 2+ | 2223 | 3362 | 3 | 9 | 6 | 13 | 10 | 8 | 20 | 19 | 11 |
| 4 | 2+ 2- 2- 2+ | 2o 2- 2- 2o | 1424 | 1222 | 17 | 13 | 12 | 18 | 15 | 13 | 12 | 15 | 14 |
| 5 | 1+ 2- 2- 1+ | 2+ 3- 2+ 3- | 4232 | 2234 | 8 | 12 | 13 | 10 | 20 | 23 | 18 | 22 | 16 |
| 6 | 1+ 2o 4- 4o | 4+ 3o 3+ 3+ | 3367 | 7646 | 8 | 16 | 48 | 52 | 65 | 30 | 37 | 35 | 36 |
| 7 | 3- 1+ 2- 3o | 3- 2o 2+ 2o | 6422 | 2435 | 24 | 8 | 12 | 29 | 23 | 16 | 18 | 15 | 18 |
| 8 | 2- 1+ 2- 2- | 2- 1o 1o 1+ | 2246 | 5432 | 11 | 9 | 13 | 13 | 11 | 7 | 7 | 9 | 10 |
| 9 | 1o 1o 1o 1+ | 1o 2- 1+ 2- | 2344 | 3533 | 6 | 6 | 7 | 8 | 7 | 11 | 9 | 13 | 8 |
| 10 | 2o 1+ 1+ 2o | 2+ 2o 2- 1+ | 3256 | 3444 | 14 | 9 | 8 | 15 | 17 | 14 | 12 | 10 | 12 |
| 11 | 2- 2- 2- 3o | 2+ 2o 2o 2o | 4114 | 1321 | 12 | 11 | 12 | 27 | 17 | 14 | 15 | 15 | 15 |
| 12 | 2- 3- 2+ 3- | 3- 3o 2+ 3- | 4542 | 3332 | 13 | 25 | 19 | 23 | 25 | 31 | 19 | 21 | 22 |
| 13 | 2o 2+ 2o 2o | 2+ 1+ 2o 2- | 4542 | 5232 | 15 | 18 | 15 | 14 | 19 | 10 | 15 | 13 | 15 |
| 14 | 1+ 2- 3- 2o | 1+ 1+ 1o 2o | 2341 | 2334 | 10 | 12 | 24 | 15 | 10 | 8 | 7 | 14 | 13 |
| 15 | 1o 1o 2o 2+ | 2o 2+ 2+ 2+ | 1299 | 9536 | 7 | 6 | 14 | 17 | 15 | 20 | 19 | 19 | 15 |
| 16 | 2o 2- 3- 2- | 2- 3- 3- 3- | 4444 | 2433 | 14 | 11 | 26 | 13 | 11 | 21 | 26 | 26 | 19 |
| 17 | 2+ 2+ 1+ 2- | 3- 1o 2- 2- | 3236 | 3353 | 20 | 17 | 8 | 13 | 21 | 7 | 11 | 13 | 14 |
| 18 | 2o 2o 2o 2o | 2- 2o 2- 2o | 3021 | 3222 | 16 | 14 | 14 | 15 | 13 | 15 | 13 | 15 | 14 |
| 19 | 3- 3- 4- 4- | 3o 2- 2- 3o | 4674 | 3325 | 23 | 22 | 42 | 41 | 33 | 13 | 13 | 31 | 27 |
| 20 | 2o 2o 1+ 2o | 2+ 2+ 3- 3o | 3232 | 2242 | 14 | 14 | 10 | 14 | 20 | 19 | 24 | 31 | 18 |
| 21 | 2o 2- 1+ 1+ | 1o 2- 2- 2o | 4233 | 3243 | 16 | 12 | 8 | 8 | 7 | 11 | 13 | 14 | 11 |
| 22 | 1+ 1+ 2- 2- | 1+ 1+ 2- 1+ | 3234 | 4432 | 9 | 8 | 13 | 11 | 10 | 8 | 12 | 9 | 10 |
| 23 | 1o 2- 1- 0+ | 1o 1+ 1+ 1+ | 2212 | 3222 | 6 | 13 | 5 | 3 | 7 | 8 | 9 | 9 | 8 |
| 24 | 1o 1+ 3- 2- | 1o 3- 3- 2+ | 2262 | 1334 | 7 | 10 | 23 | 11 | 7 | 21 | 25 | 19 | 15 |
| 25 | 1+ 2- 2- 3- | 2+ 2- 3o 3o | 5268 | 6325 | 8 | 11 | 12 | 21 | 17 | 12 | 29 | 32 | 18 |
| 26 | 3+ 2o 1+ 1o | 2- 2- 2+ 3- | 7522 | 3367 | 34 | 16 | 9 | 6 | 13 | 13 | 17 | 22 | 16 |
| 27 | 2- 2o 2o 2+ | 2- 2- 1+ 1o | 2414 | 1222 | 12 | 14 | 14 | 20 | 12 | 11 | 8 | 6 | 12 |
| 28 | 1o 2- 2o 2+ | 2o 2o 2o 2+ | 4567 | 7854 | 7 | 12 | 15 | 17 | 15 | 14 | 16 | 19 | 14 |
| 29 | 3- 3- 3- 3- | 2- 2- 2- 2o | 9786 | 6225 | 25 | 22 | 21 | 24 | 13 | 12 | 12 | 14 | 18 |
| 30 | 2- 1+ 1o 1+ | 1+ 1o 1o 1+ | 2323 | 6336 | 12 | 10 | 7 | 8 | 8 | 6 | 7 | 9 | 8 |
| | | | | | Monthly mean value of An | | | | | | | | 15.2 |

**JUNE 1987**

| | Ks | σs | as | | | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3o 2- 1o 2- | 2- 1+ 2o 2o | 5212 | 2203 | 32 | 12 | 6 | 11 | 13 | 8 | 16 | 16 | 14 |
| 2 | 3o 3- 2- 2- | 0o 0+ 0o 0+ | 3232 | 1112 | 27 | 23 | 11 | 11 | 1 | 2 | 1 | 3 | 10 |
| 3 | 0+ 1- 0+ 1o | 1- 0+ 1o 1+ | 2321 | 2132 | 2 | 5 | 3 | 6 | 4 | 2 | 7 | 8 | 5 |
| 4 | 1+ 1o 1+ 2o | 2- 1+ 1+ 1o | 3143 | 3231 | 10 | 6 | 8 | 15 | 13 | 8 | 8 | 6 | 9 |
| 5 | 1- 1+ 1o 1o | 2- 3- 1o 1+ | 3511 | 2233 | 5 | 10 | 6 | 7 | 13 | 21 | 7 | 9 | 10 |
| 6 | 1- 1+ 4o 4+ | 5- 3- 3+ 4- | 3355 | 3113 | 5 | 9 | 57 | 67 | 86 | 25 | 35 | 46 | 41 |
| 7 | 4- 1- 1o 3- | 2o 2o 2+ 3- | 4232 | 2336 | 41 | 4 | 6 | 23 | 16 | 16 | 17 | 24 | 18 |
| 8 | 1+ 1- 1o 1- | 1- 0o 0o 1- | 3222 | 2012 | 8 | 4 | 7 | 4 | 5 | 0 | 1 | 5 | 4 |
| 9 | 1- 0+ 0o 0o | 0o 0+ 1- 1o | 2211 | 1223 | 4 | 3 | 1 | 1 | 1 | 2 | 4 | 7 | 3 |
| 10 | 2o 1- 0o 0o | 0+ 0o 0+ 0+ | 6111 | 1112 | 15 | 4 | 1 | 1 | 3 | 1 | 2 | 3 | 4 |
| 11 | 1o 1o 2- 2+ | 1+ 1o 1+ 1+ | 3241 | 1122 | 6 | 7 | 11 | 19 | 10 | 7 | 9 | 8 | 10 |
| 12 | 1+ 2+ 2o 2+ | 2- 2- 2+ 2- | 1313 | 3333 | 9 | 18 | 14 | 20 | 13 | 12 | 19 | 12 | 15 |
| 13 | 2o 2+ 1+ 1+ | 2- 1- 1- 1- | 3412 | 4322 | 16 | 17 | 9 | 9 | 11 | 4 | 4 | 5 | 9 |
| 14 | 1+ 1+ 3- 2- | 1- 0o 0o 1+ | 3232 | 2115 | 9 | 8 | 25 | 13 | 4 | 1 | 1 | 10 | 9 |
| 15 | 1- 0+ 0o 0o | 0o 2- 1+ 1- | 2211 | 0132 | 4 | 2 | 1 | 1 | 0 | 12 | 8 | 5 | 4 |
| 16 | 2- 1- 2- 1- | 1- 1+ 2+ 2- | 3233 | 2141 | 12 | 5 | 12 | 5 | 5 | 8 | 17 | 11 | 9 |
| 17 | 3o 1+ 0+ 1- | 2- 0o 0+ 2- | 4321 | 2114 | 27 | 8 | 2 | 4 | 11 | 1 | 2 | 13 | 9 |
| 18 | 2- 1+ 2- 1+ | 0+ 1+ 1o 1+ | 5341 | 1323 | 11 | 10 | 12 | 9 | 2 | 8 | 6 | 8 | 8 |
| 19 | 3o 2+ 4+ 4o | 3+ 1o 2- 4o | 3243 | 4123 | 27 | 20 | 67 | 58 | 35 | 6 | 11 | 51 | 34 |
| 20 | 2- 1- 1- 1+ | 2+ 2o 3o 4- | 3222 | 5235 | 12 | 5 | 5 | 8 | 18 | 16 | 27 | 50 | 18 |
| 21 | 3o 1+ 0+ 0o | 0o 1o 2- 2o | 3301 | 1223 | 28 | 9 | 3 | 1 | 1 | 7 | 11 | 16 | 10 |
| 22 | 1o 0o 1- 1- | 0+ 0o 2- 1- | 3132 | 1022 | 6 | 1 | 5 | 4 | 2 | 0 | 11 | 4 | 4 |
| 23 | 1- 1o 0o 0o | 0o 0+ 1o 0o | 4400 | 0131 | 5 | 7 | 0 | 0 | 0 | 2 | 7 | 1 | 3 |
| 24 | 0o 0+ 1+ 1- | 0o 1+ 1+ 3- | 1222 | 1144 | 1 | 3 | 8 | 4 | 1 | 8 | 10 | 24 | 7 |
| 25 | 0+ 1- 0+ 0+ | 0o 1o 2- 4- | 2232 | 1235 | 2 | 4 | 3 | 3 | 1 | 7 | 13 | 48 | 10 |
| 26 | 3+ 2+ 1- 0o | 0+ 1o 2- 2- | 4420 | 1023 | 35 | 19 | 5 | 0 | 3 | 7 | 12 | 12 | 12 |
| 27 | 1+ 1o 1+ 2- | 1o 0+ 0o 0o | 2113 | 2230 | 8 | 6 | 10 | 12 | 7 | 3 | 1 | 0 | 6 |
| 28 | 0o 1+ 1o 0+ | 0o 0o 0o 1+ | 3531 | 0013 | 1 | 10 | 6 | 2 | 0 | 0 | 1 | 9 | 4 |
| 29 | 1o 1+ 1o 2- | 0+ 1+ 1o 1+ | 4314 | 1303 | 7 | 10 | 6 | 11 | 2 | 8 | 7 | 10 | 8 |
| 30 | 1o 1o 1- 0+ | 0o 0o 0o 0o | 2141 | 0010 | 7 | 6 | 4 | 2 | 0 | 0 | 1 | 0 | 3 |
| | | | | | Monthly mean value of As | | | | | | | | 10.3 |

**JULY 1987**

| | Kn | | | | | | | | σn | | an | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0+ | 1o | 0+ | 0+ | 1o | 1+ | 1o | 1- | 2211 | 2111 | 3 | 6 | 3 | 3 | 7 | 9 | 7 | 5 | 5 |
| 2 | 1+ | 1o | 1o | 1o | 1o | 1o | 2- | 1+ | 1422 | 2222 | 8 | 7 | 7 | 6 | 6 | 7 | 12 | 10 | 8 |
| 3 | 1o | 2- | 1+ | 2o | 1+ | 1+ | 4- | 3+ | 3321 | 2322 | 6 | 11 | 10 | 15 | 10 | 10 | 48 | 34 | 18 |
| 4 | 3o | 3o | 2+ | 1o | 1+ | 2o | 3- | 2- | 2222 | 3223 | 27 | 27 | 17 | 6 | 8 | 14 | 22 | 12 | 17 |
| 5 | 2- | 2o | 2+ | 2o | 2- | 2- | 2o | 2o | 3322 | 2312 | 12 | 14 | 20 | 14 | 13 | 11 | 15 | 14 | 14 |
| 6 | 1+ | 2- | 2- | 1+ | 2o | 2- | 2o | 2- | 3122 | 2431 | 10 | 13 | 11 | 10 | 14 | 11 | 14 | 12 | 12 |
| 7 | 1o | 1- | 1o | 2- | 1+ | 2- | 2- | 1+ | 3224 | 2213 | 7 | 4 | 7 | 11 | 10 | 11 | 13 | 8 | 9 |
| 8 | 2o | 3- | 3- | 3o | 3- | 2o | 2o | 2+ | 0221 | 3112 | 14 | 21 | 24 | 31 | 24 | 15 | 15 | 18 | 20 |
| 9 | 2- | 2+ | 3- | 2+ | 2o | 3- | 3- | 3o | 2222 | 1223 | 12 | 20 | 21 | 18 | 15 | 23 | 21 | 28 | 20 |
| 10 | 3o | 3- | 2+ | 3o | 3o | 2o | 2o | 1+ | 2233 | 1223 | 31 | 23 | 20 | 28 | 32 | 16 | 14 | 10 | 22 |
| 11 | 2- | 2o | 3- | 1+ | 2- | 2- | 2o | 2o | 4453 | 2331 | 11 | 16 | 22 | 9 | 13 | 12 | 16 | 15 | 14 |
| 12 | 1+ | 2- | 2+ | 3o | 2o | 2o | 2o | 2+ | 2334 | 2332 | 8 | 12 | 20 | 33 | 16 | 14 | 16 | 18 | 17 |
| 13 | 1+ | 1o | 1+ | 1+ | 1+ | 1o | 1+ | 2+ | 3222 | 3222 | 10 | 7 | 9 | 9 | 8 | 7 | 10 | 17 | 10 |
| 14 | 2- | 2+ | 2o | 2- | 1o | 2- | 2- | 1+ | 3332 | 3122 | 13 | 19 | 15 | 12 | 6 | 11 | 13 | 10 | 12 |
| 15 | 2o | 2o | 4o | 4- | 4o | 4- | 4- | 4+ | 3334 | 2322 | 14 | 14 | 60 | 43 | 56 | 44 | 45 | 61 | 42 |
| 16 | 4- | 3o | 4- | 4- | 2+ | 3+ | 3o | 4- | 4234 | 2232 | 50 | 31 | 43 | 47 | 18 | 38 | 27 | 43 | 37 |
| 17 | 3- | 3+ | 3- | 3o | 3+ | 2o | 3- | 3- | 3423 | 2222 | 22 | 39 | 24 | 30 | 35 | 15 | 25 | 26 | 27 |
| 18 | 3- | 3- | 2o | 2+ | 2+ | 2+ | 3- | 2+ | 1321 | 2432 | 26 | 26 | 16 | 19 | 20 | 18 | 25 | 18 | 21 |
| 19 | 2+ | 2- | 1+ | 2+ | 2+ | 2+ | 3- | 3- | 2321 | 4222 | 17 | 11 | 8 | 17 | 20 | 18 | 24 | 22 | 17 |
| 20 | 1+ | 2+ | 2- | 1+ | 2+ | 2+ | 2+ | 3- | 2224 | 2343 | 10 | 19 | 11 | 10 | 18 | 19 | 20 | 26 | 17 |
| 21 | 2- | 2- | 2+ | 2- | 2- | 2- | 2- | 2o | 3233 | 2333 | 11 | 12 | 18 | 11 | 12 | 13 | 12 | 15 | 13 |
| 22 | 2o | 2o | 3o | 2+ | 2- | 2- | 3- | 2+ | 2242 | 2333 | 14 | 15 | 27 | 18 | 13 | 13 | 21 | 17 | 17 |
| 23 | 1o | 1+ | 1+ | 1- | 2- | 2- | 2o | 3- | 2233 | 2322 | 7 | 9 | 8 | 5 | 12 | 11 | 15 | 22 | 11 |
| 24 | 1+ | 2- | 1o | 1o | 1+ | 3+ | 4- | 3- | 2313 | 4322 | 9 | 11 | 6 | 6 | 9 | 40 | 41 | 25 | 18 |
| 25 | 3- | 3- | 3+ | 4o | 3o | 3- | 3- | 2+ | 4322 | 4322 | 24 | 22 | 38 | 58 | 32 | 23 | 24 | 17 | 30 |
| 26 | 1o | 1- | 1+ | 1+ | 1o | 1+ | 1o | 1o | 3331 | 3233 | 7 | 5 | 10 | 10 | 6 | 8 | 6 | 6 | 7 |
| 27 | 2- | 1+ | 2- | 1o | 2o | 1+ | 2- | 1o | 2322 | 2243 | 13 | 8 | 12 | 6 | 14 | 9 | 11 | 6 | 10 |
| 28 | 1+ | 1+ | 3o | 4- | 4o | 4o | 4- | 5- | 6523 | 1234 | 8 | 8 | 28 | 44 | 58 | 53 | 44 | 86 | 41 |
| 29 | 5o | 6- | 5- | 5- | 4o | 3- | 2o | 1+ | 2444 | 3344 | 96 | 126 | 76 | 82 | 56 | 25 | 14 | 10 | 61 |
| 30 | 3o | 2- | 2- | 2- | 3- | 2- | 3- | 3- | 5432 | 4221 | 28 | 12 | 13 | 11 | 23 | 11 | 21 | 26 | 18 |
| 31 | 3o | 4o | 3- | 2+ | 2o | 2o | 2o | 2+ | 3213 | 2323 | 33 | 57 | 26 | 17 | 16 | 14 | 16 | 17 | 25 |
| | | | | | | | | | | | Monthly mean value of An | | | | | | | | 19.7 |

**JULY 1987**

| | Ks | | | | | | | | σs | | as | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0o | 0o | 0o | 0o | 0o | 0+ | 0+ | 0+ | 0101 | 1222 | 0 | 1 | 0 | 1 | 1 | 2 | 3 | 3 | 1 |
| 2 | 0+ | 1- | 0+ | 0o | 0o | 0o | 1+ | 1o | 2511 | 2131 | 3 | 5 | 2 | 1 | 1 | 1 | 10 | 6 | 4 |
| 3 | 1- | 1o | 1o | 1o | 1- | 0+ | 3- | 3- | 2420 | 3124 | 4 | 7 | 6 | 7 | 4 | 2 | 26 | 24 | 10 |
| 4 | 3- | 2o | 2- | 0o | 0o | 1o | 2o | 1+ | 2241 | 0221 | 21 | 14 | 12 | 1 | 0 | 6 | 15 | 8 | 10 |
| 5 | 2o | 1+ | 2- | 1+ | 1- | 1+ | 1+ | 2- | 5232 | 2313 | 14 | 10 | 12 | 8 | 5 | 9 | 10 | 12 | 10 |
| 6 | 1+ | 1+ | 1o | 1- | 1o | 1- | 2- | 2+ | 4332 | 3334 | 8 | 10 | 6 | 4 | 7 | 5 | 12 | 17 | 9 |
| 7 | 1- | 0+ | 0o | 0o | 0+ | 1- | 2- | 1- | 2112 | 2122 | 4 | 2 | 1 | 1 | 3 | 5 | 12 | 4 | 4 |
| 8 | 1+ | 2+ | 2o | 2o | 2- | 1+ | 1+ | 2- | 3442 | 4212 | 9 | 18 | 16 | 15 | 12 | 10 | 10 | 13 | 13 |
| 9 | 1+ | 2+ | 2o | 2+ | 1o | 2- | 1+ | 2o | 2354 | 0312 | 10 | 20 | 16 | 17 | 7 | 13 | 8 | 16 | 13 |
| 10 | 3+ | 2+ | 3- | 3- | 3- | 2- | 2- | 1o | 4432 | 3220 | 36 | 20 | 21 | 23 | 23 | 12 | 13 | 7 | 19 |
| 11 | 1+ | 2o | 2+ | 1o | 1o | 1o | 1+ | 2- | 5254 | 2224 | 9 | 15 | 19 | 7 | 6 | 7 | 8 | 12 | 10 |
| 12 | 1o | 1+ | 2- | 3- | 2- | 1+ | 1o | 1+ | 3336 | 2144 | 6 | 10 | 11 | 21 | 12 | 8 | 7 | 10 | 11 |
| 13 | 1+ | 0+ | 0+ | 0o | 0o | 0o | 0+ | 1+ | 4221 | 1123 | 8 | 3 | 3 | 1 | 1 | 1 | 3 | 9 | 4 |
| 14 | 2- | 1+ | 2- | 1o | 0o | 1- | 1o | 2- | 2241 | 1222 | 12 | 9 | 11 | 7 | 1 | 5 | 7 | 11 | 8 |
| 15 | 1o | 1+ | 4- | 3- | 4- | 4- | 3+ | 4- | 2432 | 4313 | 6 | 8 | 49 | 23 | 50 | 44 | 34 | 48 | 33 |
| 16 | 4+ | 4- | 3o | 3o | 2- | 3+ | 3o | 4- | 6334 | 2224 | 69 | 41 | 29 | 33 | 12 | 38 | 27 | 43 | 37 |
| 17 | 3o | 3+ | 3- | 3o | 3o | 1+ | 3- | 2+ | 5443 | 3233 | 31 | 39 | 23 | 31 | 33 | 9 | 24 | 18 | 26 |
| 18 | 3o | 3- | 2o | 2+ | 2+ | 2+ | 3o | 2+ | 3524 | 3332 | 27 | 21 | 15 | 19 | 19 | 18 | 27 | 18 | 21 |
| 19 | 2+ | 1+ | 0+ | 2+ | 3- | 2- | 2o | 2+ | 3324 | 4321 | 19 | 9 | 3 | 19 | 21 | 11 | 16 | 17 | 14 |
| 20 | 2- | 2+ | 1o | 0+ | 1o | 2o | 2- | 3+ | 2422 | 0424 | 13 | 20 | 7 | 3 | 7 | 14 | 11 | 34 | 14 |
| 21 | 1+ | 1- | 2o | 1+ | 1- | 1o | 0+ | 1- | 3252 | 2322 | 9 | 5 | 16 | 8 | 4 | 6 | 3 | 5 | 7 |
| 22 | 2- | 1+ | 2+ | 1+ | 0o | 0+ | 2- | 1+ | 3344 | 1252 | 12 | 10 | 19 | 9 | 1 | 2 | 13 | 10 | 10 |
| 23 | 1o | 1- | 0+ | 0o | 1+ | 1o | 1+ | 2o | 2331 | 4133 | 6 | 4 | 2 | 1 | 9 | 6 | 10 | 16 | 7 |
| 24 | 1- | 1+ | 0+ | 0+ | 0o | 3- | 3o | 3- | 2522 | 1212 | 5 | 9 | 2 | 3 | 1 | 22 | 33 | 24 | 12 |
| 25 | 3- | 3- | 3o | 4- | 3- | 3- | 2+ | 2+ | 5223 | 2241 | 24 | 22 | 33 | 50 | 22 | 23 | 20 | 17 | 26 |
| 26 | 0+ | 0+ | 1o | 0+ | 0o | 0o | 0+ | 0+ | 2212 | 1111 | 3 | 3 | 6 | 3 | 1 | 1 | 2 | 2 | 3 |
| 27 | 2- | 1+ | 1o | 1- | 1- | 0+ | 1- | 0+ | 4222 | 3311 | 13 | 8 | 7 | 4 | 5 | 3 | 5 | 3 | 6 |
| 28 | 1+ | 1- | 2+ | 3+ | 4- | 3+ | 3o | 4- | 4323 | 3332 | 8 | 5 | 19 | 37 | 49 | 37 | 27 | 49 | 29 |
| 29 | 5+ | 5+ | 5o | 5o | 4o | 2+ | 0+ | 1o | 2455 | 4121 | 108 | 112 | 87 | 92 | 52 | 17 | 3 | 6 | 60 |
| 30 | 3- | 0+ | 1+ | 1+ | 3- | 1+ | 2- | 3+ | 5243 | 4224 | 26 | 3 | 8 | 8 | 21 | 10 | 13 | 37 | 16 |
| 31 | 3o | 5- | 3- | 2- | 1+ | 1+ | 2- | 1o | 0422 | 1133 | 32 | 74 | 22 | 12 | 9 | 8 | 13 | 7 | 22 |
| | | | | | | | | | | | Monthly mean value of As | | | | | | | | 15.1 |

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| | Kn | σn | an | | | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3o 4- 2o 2+ | 2o 2o 2- 1+ | 5612 | 2123 | 30 | 46 | 14 | 19 | 16 | 15 | 11 | 10 | 20 |
| 2 | 2o 2- 2- 1o | 1+ 1+ 1+ 1+ | 4223 | 0332 | 16 | 11 | 12 | 6 | 9 | 10 | 8 | 10 | 10 |
| 3 | 1o 2- 2o 3- | 3o 4o 3o 1+ | 4513 | 3222 | 6 | 11 | 15 | 25 | 27 | 51 | 31 | 10 | 22 |
| 4 | 1+ 2o 1+ 1+ | 1+ 2o 2+ 3- | 3332 | 2422 | 8 | 15 | 8 | 10 | 9 | 16 | 19 | 21 | 13 |
| 5 | 3+ 3+ 4- 3o | 3o 2+ 2+ 2- | 3442 | 4233 | 34 | 34 | 41 | 27 | 28 | 18 | 18 | 13 | 27 |
| 6 | 1+ 2+ 2+ 3o | 3- 3- 2o 2- | 3445 | 2423 | 8 | 17 | 18 | 29 | 21 | 25 | 16 | 11 | 18 |
| 7 | 2+ 1+ 1- 1+ | 2- 1+ 1o 1+ | 5211 | 2232 | 17 | 8 | 5 | 8 | 13 | 10 | 6 | 9 | 10 |
| 8 | 1+ 2- 2- 2+ | 3- 2o 3- 4o | 2334 | 4313 | 8 | 11 | 13 | 18 | 23 | 14 | 23 | 51 | 20 |
| 9 | 3o 3- 3- 2o | 3- 1+ 2- 1+ | 2433 | 3222 | 30 | 25 | 23 | 16 | 26 | 9 | 12 | 10 | 19 |
| 10 | 1- 1o 1+ 1+ | 1o 2- 2o 2- | 2352 | 2222 | 5 | 6 | 9 | 9 | 7 | 12 | 15 | 13 | 10 |
| 11 | 2- 1+ 1- 1o | 2- 2+ 3- 2+ | 1122 | 2232 | 13 | 9 | 5 | 7 | 12 | 18 | 25 | 20 | 14 |
| 12 | 3- 2+ 3- 2+ | 3+ 3+ 3o 4- | 5432 | 4332 | 26 | 20 | 23 | 18 | 35 | 36 | 33 | 46 | 30 |
| 13 | 3o 3+ 5o 4o | 3- 2o 3- 3o | 4242 | 2132 | 30 | 37 | 94 | 53 | 24 | 16 | 21 | 33 | 39 |
| 14 | 3o 4o 3- 3- | 3o 3- 3o 3o | 3422 | 2213 | 30 | 56 | 21 | 21 | 29 | 23 | 31 | 29 | 30 |
| 15 | 2+ 3+ 3+ 4- | 3o 3- 3o 4- | 3212 | 1322 | 20 | 34 | 40 | 42 | 32 | 21 | 33 | 49 | 34 |
| 16 | 3o 3+ 3o 3o | 2o 2o 2+ 2o | 4323 | 1222 | 30 | 34 | 30 | 28 | 15 | 14 | 18 | 15 | 23 |
| 17 | 2+ 2+ 2o 2+ | 3+ 3+ 2+ 2+ | 4203 | 3232 | 20 | 18 | 14 | 17 | 37 | 39 | 19 | 17 | 23 |
| 18 | 2- 3- 2o 2- | 1+ 2- 2- 2- | 3312 | 1122 | 11 | 24 | 14 | 12 | 10 | 13 | 11 | 12 | 13 |
| 19 | 1+ 2+ 2+ 2o | 3- 2+ 2o 2o | 1311 | 2312 | 10 | 19 | 18 | 14 | 24 | 17 | 14 | 16 | 17 |
| 20 | 2o 3- 2o 3- | 2+ 2o 2+ 2- | 1222 | 1421 | 15 | 21 | 15 | 24 | 19 | 15 | 19 | 13 | 18 |
| 21 | 2+ 2- 2o 1+ | 1o 2- 2o 1- | 4242 | 1344 | 18 | 11 | 14 | 9 | 7 | 13 | 15 | 4 | 11 |
| 22 | 1o 1+ 1+ 3- | 2o 2o 3- 2o | 4321 | 3222 | 7 | 10 | 10 | 26 | 15 | 16 | 22 | 15 | 15 |
| 23 | 2- 2+ 3- 3- | 3- 3o 3- 3- | 1423 | 4423 | 13 | 17 | 24 | 21 | 21 | 31 | 23 | 21 | 21 |
| 24 | 2o 2- 1o 4- | 3+ 3- 3o 3- | 3324 | 2453 | 15 | 13 | 7 | 43 | 38 | 23 | 29 | 23 | 24 |
| 25 | 3- 2- 4- 5+ | 5o 4+ 4o 4o | 2337 | 3143 | 24 | 12 | 43 | 113 | 98 | 64 | 59 | 56 | 59 |
| 26 | 5o 5+ 4+ 5- | 4+ 3+ 3+ 3o | 5442 | 5242 | 89 | 105 | 70 | 71 | 65 | 39 | 36 | 30 | 63 |
| 27 | 3- 3- 3+ 3+ | 4- 5- 3+ 2o | 3120 | 2143 | 22 | 26 | 34 | 38 | 41 | 72 | 38 | 14 | 36 |
| 28 | 2o 2+ 1+ 2+ | 3- 3o 3+ 4+ | 4435 | 2354 | 14 | 17 | 10 | 19 | 23 | 27 | 38 | 61 | 26 |
| 29 | 3o 1+ 2- 3o | 1+ 3o 3+ 3- | 4133 | 1342 | 32 | 8 | 11 | 30 | 9 | 32 | 36 | 26 | 23 |
| 30 | 2o 3o 5- 3o | 2o 3o 3o 3- | 3336 | 1331 | 16 | 31 | 71 | 27 | 16 | 29 | 29 | 26 | 31 |
| 31 | 3o 3+ 5+ 3o | 5- 5o 3+ 3- | 4352 | 4222 | 30 | 38 | 104 | 33 | 78 | 91 | 37 | 26 | 55 |
| | | | | | | | | | Monthly mean value of An | | | | 25.0 |

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| | Ks | σs | as | | | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3- 3o 2- 2o | 1o 2- 1o 1- | 4222 | 2132 | 26 | 32 | 12 | 14 | 7 | 11 | 6 | 5 | 14 |
| 2 | 2+ 1o 1+ 0+ | 1o 1- 1- 0+ | 6320 | 1222 | 20 | 7 | 8 | 3 | 6 | 4 | 4 | 3 | 7 |
| 3 | 1o 2- 1+ 2+ | 3- 4o 2+ 1o | 3724 | 3112 | 6 | 12 | 10 | 18 | 24 | 53 | 17 | 7 | 18 |
| 4 | 1o 2- 1+ 1- | 1- 2o 2- 3- | 3421 | 2432 | 6 | 12 | 8 | 5 | 4 | 16 | 13 | 21 | 11 |
| 5 | 3o 3o 3+ 3- | 3- 2- 2o 1+ | 3642 | 5142 | 32 | 32 | 36 | 26 | 25 | 13 | 15 | 9 | 24 |
| 6 | 1o 2- 2- 2+ | 2o 2+ 2o 1o | 1533 | 2124 | 6 | 13 | 12 | 18 | 15 | 17 | 15 | 7 | 13 |
| 7 | 2- 1- 0+ 0+ | 1o 0+ 0o 0+ | 5210 | 3302 | 13 | 4 | 2 | 3 | 6 | 2 | 0 | 3 | 4 |
| 8 | 1o 1+ 2- 2- | 2+ 2o 2- 4- | 2434 | 4124 | 7 | 8 | 13 | 12 | 19 | 14 | 12 | 48 | 17 |
| 9 | 4- 3- 2o 1+ | 3- 2- 1+ 0+ | 4521 | 2310 | 42 | 21 | 16 | 10 | 26 | 12 | 10 | 3 | 18 |
| 10 | 0+ 0+ 0+ 1- | 1- 1+ 1o 1o | 2222 | 3121 | 3 | 3 | 3 | 4 | 4 | 8 | 6 | 6 | 5 |
| 11 | 1+ 1- 0o 0o | 1- 2- 2+ 2- | 3102 | 2112 | 9 | 5 | 0 | 1 | 5 | 13 | 17 | 13 | 8 |
| 12 | 3- 2+ 2- 2o | 3+ 3+ 3- 4o | 6311 | 3325 | 26 | 19 | 13 | 14 | 38 | 39 | 22 | 52 | 28 |
| 13 | 3+ 3o 5o 4- | 2o 2- 3- 3o | 4241 | 1133 | 35 | 30 | 103 | 49 | 15 | 11 | 26 | 31 | 38 |
| 14 | 4- 4+ 2+ 2+ | 3- 3o 3+ 3+ | 3223 | 2215 | 45 | 68 | 20 | 20 | 22 | 29 | 34 | 39 | 35 |
| 15 | 2+ 4- 3+ 3+ | 3- 3- 3+ 4o | 4233 | 2224 | 19 | 41 | 34 | 37 | 26 | 21 | 38 | 53 | 34 |
| 16 | 3+ 3o 3- 3- | 2o 1+ 2+ 2o | 6124 | 2233 | 40 | 28 | 22 | 26 | 16 | 10 | 18 | 15 | 22 |
| 17 | 2+ 2- 1+ 2- | 3- 3+ 2- 2- | 5416 | 2323 | 18 | 11 | 10 | 13 | 26 | 37 | 13 | 13 | 18 |
| 18 | 1+ 3- 1+ 1o | 0+ 1+ 1+ 1+ | 1420 | 1124 | 10 | 22 | 10 | 7 | 2 | 8 | 8 | 10 | 10 |
| 19 | 2- 2+ 2+ 1o | 2+ 2- 1+ 2+ | 3410 | 3224 | 11 | 17 | 17 | 7 | 20 | 12 | 9 | 17 | 14 |
| 20 | 2- 2o 2- 2+ | 2o 1+ 2- 1o | 3223 | 2320 | 12 | 15 | 13 | 19 | 15 | 10 | 12 | 7 | 13 |
| 21 | 2+ 1+ 1+ 0+ | 0+ 1+ 1+ 0o | 4351 | 1330 | 18 | 9 | 10 | 2 | 2 | 9 | 10 | 0 | 8 |
| 22 | 1o 1- 1o 3- | 1o 2- 2+ 1+ | 5312 | 3231 | 6 | 5 | 6 | 22 | 6 | 12 | 18 | 9 | 11 |
| 23 | 1+ 2o 2- 2+ | 2+ 3- 2+ 2+ | 3522 | 2234 | 10 | 16 | 11 | 18 | 19 | 26 | 18 | 20 | 17 |
| 24 | 2- 1+ 1- 3+ | 3+ 3- 3o 1+ | 2313 | 3351 | 13 | 10 | 5 | 39 | 39 | 26 | 28 | 8 | 21 |
| 25 | 2o 1+ 4- 5- | 6- 5o 5- 5- | 2343 | 2122 | 16 | 10 | 41 | 76 | 134 | 87 | 76 | 76 | 65 |
| 26 | 5o 5o 4+ 4o | 5- 3+ 4o 3o | 6353 | 5143 | 102 | 98 | 61 | 55 | 78 | 38 | 58 | 29 | 65 |
| 27 | 3+ 3o 4- 3+ | 4- 5- 4- 1+ | 5353 | 2232 | 34 | 27 | 42 | 40 | 44 | 74 | 43 | 8 | 39 |
| 28 | 2- 2- 1- 2o | 2o 3- 3+ 4+ | 5413 | 2145 | 11 | 12 | 5 | 14 | 14 | 24 | 37 | 67 | 23 |
| 29 | 3+ 1+ 1+ 2+ | 1o 3o 3o 3o | 6142 | 1144 | 37 | 8 | 9 | 17 | 6 | 29 | 30 | 27 | 20 |
| 30 | 3- 3o 5- 3o | 2- 3o 3- 3- | 6233 | 3222 | 25 | 31 | 73 | 28 | 12 | 29 | 26 | 25 | 31 |
| 31 | 3o 3+ 5- 2+ | 4+ 5- 3- 3- | 5443 | 3214 | 31 | 35 | 83 | 20 | 67 | 72 | 25 | 23 | 45 |
| | | | | | | | | | Monthly mean value of As | | | | 22.5 |

**SEPTEMBER 1987**

| | Kn | | | | | | | | σn | | an | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4- | 4o | 4o | 4- | 5- | 4+ | 3+ | 4- | 5435 | 5634 | 48 | 57 | 52 | 47 | 74 | 61 | 37 | 50 | 53 |
| 2 | 3+ | 3+ | 3+ | 2+ | 2+ | 2+ | 2+ | 2- | 4452 | 2322 | 38 | 36 | 34 | 20 | 20 | 18 | 18 | 11 | 24 |
| 3 | 1- | 1+ | 2+ | 1+ | 1+ | 1- | 0+ | 0+ | 2253 | 1212 | 4 | 9 | 19 | 8 | 8 | 5 | 2 | 3 | 7 |
| 4 | 2- | 2+ | 1- | 2- | 2o | 3- | 2o | 2+ | 4403 | 2544 | 12 | 18 | 4 | 12 | 16 | 22 | 15 | 18 | 15 |
| 5 | 2o | 2- | 2+ | 3- | 2- | 1+ | 2- | 2- | 4543 | 2112 | 15 | 11 | 19 | 21 | 13 | 8 | 13 | 12 | 14 |
| 6 | 1+ | 1+ | 2o | 3+ | 2+ | 2+ | 3- | 2- | 4542 | 2352 | 10 | 10 | 16 | 34 | 18 | 19 | 26 | 12 | 18 |
| 7 | 1- | 2- | 2+ | 3- | 3o | 3- | 2- | 3+ | 2223 | 1112 | 4 | 12 | 18 | 24 | 32 | 21 | 11 | 34 | 20 |
| 8 | 3- | 2o | 2o | 3- | 2+ | 3- | 2- | 2o | 3213 | 3322 | 24 | 15 | 15 | 24 | 19 | 21 | 12 | 15 | 18 |
| 9 | 2- | 2+ | 4- | 3- | 2- | 1o | 2- | 2- | 1341 | 3232 | 12 | 19 | 44 | 21 | 11 | 7 | 13 | 12 | 17 |
| 10 | 2- | 1o | 1+ | 3+ | 5+ | 5- | 4o | 5o | 2111 | 2333 | 12 | 6 | 8 | 34 | 104 | 84 | 51 | 89 | 49 |
| 11 | 5- | 4- | 4- | 5- | 3+ | 4o | 4+ | 4o | 3322 | 2344 | 74 | 45 | 47 | 76 | 40 | 52 | 63 | 54 | 56 |
| 12 | 2+ | 3+ | 3+ | 3- | 3+ | 3o | 4o | 4o | 2333 | 2252 | 18 | 35 | 38 | 24 | 34 | 30 | 52 | 51 | 35 |
| 13 | 4- | 3o | 2o | 2+ | 4+ | 4+ | 2+ | 4+ | 3202 | 6222 | 50 | 31 | 14 | 18 | 62 | 66 | 18 | 67 | 41 |
| 14 | 4+ | 4o | 3+ | 4- | 3o | 3o | 4o | 3- | 3132 | 3423 | 66 | 56 | 38 | 43 | 33 | 29 | 51 | 26 | 43 |
| 15 | 3o | 3+ | 4o | 3+ | 3+ | 4- | 4- | 4+ | 4343 | 3351 | 32 | 35 | 55 | 40 | 36 | 48 | 44 | 61 | 44 |
| 16 | 4o | 2+ | 3- | 3+ | 3o | 3- | 3- | 3- | 5323 | 3133 | 56 | 17 | 26 | 36 | 27 | 24 | 23 | 23 | 29 |
| 17 | 2- | 3+ | 3- | 3o | 3o | 3o | 3+ | 3o | 3433 | 3244 | 13 | 37 | 26 | 33 | 33 | 28 | 34 | 31 | 29 |
| 18 | 2o | 2- | 3- | 3- | 2- | 2o | 2- | 2- | 1233 | 2122 | 15 | 11 | 21 | 21 | 11 | 14 | 12 | 13 | 15 |
| 19 | 1+ | 0+ | 1- | 2o | 1+ | 1+ | 1o | 0+ | 2221 | 1322 | 9 | 3 | 4 | 14 | 8 | 8 | 6 | 2 | 7 |
| 20 | 1o | 2- | 1o | 2- | 2+ | 4- | 4o | 3- | 1223 | 2562 | 6 | 13 | 6 | 12 | 20 | 50 | 55 | 21 | 23 |
| 21 | 2- | 2+ | 2+ | 3- | 3o | 2- | 2- | 1+ | 3411 | 3322 | 12 | 18 | 17 | 26 | 32 | 12 | 12 | 10 | 17 |
| 22 | 3o | 3+ | 3- | 2o | 2- | 4+ | 4o | 5o | 4432 | 2333 | 30 | 35 | 21 | 14 | 12 | 63 | 59 | 93 | 41 |
| 23 | 4+ | 3+ | 3+ | 2o | 2- | 2- | 2- | 1o | 4542 | 1232 | 62 | 35 | 37 | 16 | 13 | 11 | 12 | 7 | 24 |
| 24 | 3o | 3+ | 2+ | 2+ | 2+ | 2o | 3- | 2+ | 4312 | 2121 | 28 | 37 | 17 | 20 | 17 | 16 | 22 | 20 | 22 |
| 25 | 2o | 3- | 4- | 5o | 5- | 5- | 5o | 5+ | 3456 | 2252 | 16 | 25 | 47 | 89 | 85 | 86 | 90 | 108 | 68 |
| 26 | 3- | 4- | 4- | 4- | 3+ | 2+ | 3+ | 1+ | 3636 | 4222 | 21 | 46 | 48 | 49 | 35 | 18 | 39 | 10 | 33 |
| 27 | 3- | 2+ | 2- | 2+ | 2o | 3- | 3o | 3- | 3212 | 1412 | 26 | 17 | 11 | 19 | 16 | 22 | 29 | 22 | 20 |
| 28 | 5- | 2o | 3- | 4+ | 3+ | 3- | 3+ | 3o | 3224 | 3232 | 73 | 14 | 23 | 63 | 38 | 22 | 35 | 31 | 37 |
| 29 | 3o | 3o | 2+ | 3o | 5- | 5- | 4- | 3+ | 3432 | 3443 | 29 | 31 | 18 | 30 | 75 | 78 | 49 | 40 | 44 |
| 30 | 5- | 5o | 4+ | 4o | 4o | 5- | 4- | 2+ | 1635 | 5822 | 77 | 94 | 69 | 57 | 56 | 84 | 44 | 20 | 63 |
| | | | | | | | | | | | | | | | | | | Monthly mean value of An | 30.9 |

**SEPTEMBER 1987**

| | Ks | | | | | | | | σs | | as | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4- | 4o | 4- | 4o | 4+ | 4- | 3+ | 4o | 5325 | 3335 | 43 | 56 | 44 | 53 | 67 | 49 | 37 | 53 | 50 |
| 2 | 3o | 3o | 3- | 2- | 2o | 2+ | 3- | 1- | 6423 | 3531 | 32 | 31 | 21 | 13 | 16 | 17 | 21 | 5 | 20 |
| 3 | 0+ | 1o | 2o | 1- | 1- | 0+ | 0+ | 0o | 2232 | 3241 | 2 | 7 | 16 | 5 | 4 | 3 | 3 | 1 | 5 |
| 4 | 1+ | 2+ | 0o | 1+ | 1+ | 2+ | 2+ | 2+ | 2514 | 2545 | 10 | 17 | 1 | 8 | 10 | 19 | 20 | 19 | 13 |
| 5 | 2o | 1+ | 2o | 2+ | 2- | 0+ | 1o | 2- | 5453 | 2223 | 16 | 9 | 14 | 18 | 11 | 3 | 7 | 11 | 11 |
| 6 | 2- | 1+ | 1+ | 3o | 2- | 2+ | 3- | 1+ | 4423 | 2244 | 13 | 8 | 9 | 31 | 13 | 20 | 26 | 10 | 16 |
| 7 | 0+ | 1o | 2o | 2o | 3+ | 3- | 1o | 3+ | 2011 | 1331 | 3 | 7 | 15 | 15 | 34 | 22 | 7 | 36 | 17 |
| 8 | 3o | 2- | 2- | 3- | 2- | 2- | 2- | 2- | 3322 | 2223 | 31 | 11 | 12 | 21 | 12 | 13 | 11 | 13 | 16 |
| 9 | 2- | 2o | 4- | 2o | 2- | 0+ | 1+ | 1+ | 3322 | 2243 | 13 | 15 | 44 | 16 | 11 | 2 | 9 | 9 | 15 |
| 10 | 2- | 0+ | 0+ | 3o | 5o | 5- | 4- | 5- | 4311 | 1114 | 12 | 3 | 2 | 27 | 94 | 85 | 47 | 81 | 44 |
| 11 | 5- | 3o | 4- | 5- | 3+ | 4+ | 5- | 4+ | 6232 | 2125 | 81 | 32 | 48 | 73 | 37 | 69 | 82 | 66 | 61 |
| 12 | 2+ | 4- | 3o | 3- | 3- | 3+ | 3+ | 4o | 3352 | 2134 | 19 | 43 | 33 | 23 | 26 | 35 | 40 | 53 | 34 |
| 13 | 4- | 3+ | 2- | 2- | 4o | 4+ | 2o | 5- | 4412 | 3134 | 48 | 35 | 13 | 13 | 59 | 62 | 15 | 73 | 40 |
| 14 | 4+ | 4+ | 3+ | 3+ | 3- | 2+ | 4+ | 3- | 2411 | 1332 | 62 | 68 | 34 | 38 | 25 | 19 | 66 | 25 | 42 |
| 15 | 3+ | 3+ | 4- | 3+ | 3o | 4o | 4- | 4o | 2223 | 3133 | 39 | 35 | 41 | 37 | 28 | 51 | 43 | 56 | 41 |
| 16 | 4o | 2+ | 3o | 3+ | 3- | 3- | 3- | 3o | 5411 | 4323 | 56 | 18 | 30 | 35 | 26 | 24 | 23 | 28 | 30 |
| 17 | 2o | 3+ | 3- | 3- | 3o | 3- | 3+ | 3o | 2213 | 3242 | 14 | 35 | 21 | 26 | 27 | 21 | 34 | 32 | 26 |
| 18 | 3- | 2- | 2o | 2+ | 1o | 1o | 1+ | 1o | 4453 | 3112 | 23 | 11 | 16 | 18 | 6 | 7 | 9 | 6 | 12 |
| 19 | 1+ | 0+ | 0o | 1+ | 1- | 1o | 0o | 0o | 3203 | 3211 | 9 | 3 | 0 | 8 | 4 | 6 | 1 | 1 | 4 |
| 20 | 1o | 2+ | 1- | 2- | 2o | 3o | 3o | 2+ | 2324 | 2421 | 7 | 17 | 4 | 11 | 16 | 32 | 30 | 17 | 17 |
| 21 | 2o | 2+ | 2+ | 3- | 3o | 1+ | 1+ | 1o | 3312 | 2211 | 16 | 19 | 17 | 23 | 28 | 8 | 9 | 6 | 16 |
| 22 | 3o | 3- | 3- | 2o | 2- | 4+ | 4- | 5o | 5443 | 3328 | 28 | 26 | 21 | 15 | 11 | 62 | 42 | 95 | 38 |
| 23 | 4- | 3- | 3o | 2- | 1+ | 2- | 2- | 0+ | 6441 | 2222 | 48 | 24 | 28 | 12 | 10 | 13 | 12 | 3 | 19 |
| 24 | 3+ | 3+ | 2+ | 2+ | 2o | 2- | 2+ | 2+ | 2411 | 1211 | 35 | 38 | 19 | 17 | 15 | 11 | 17 | 17 | 21 |
| 25 | 2+ | 3o | 4- | 4+ | 5- | 5o | 5+ | 5+ | 3234 | 4476 | 19 | 27 | 48 | 66 | 85 | 93 | 112 | 105 | 69 |
| 26 | 3- | 3o | 3o | 4- | 3o | 3- | 3o | 2- | 2433 | 3242 | 21 | 33 | 31 | 49 | 32 | 22 | 32 | 11 | 29 |
| 27 | 3o | 2+ | 2o | 2+ | 2- | 3- | 3o | 3- | 3112 | 2242 | 29 | 17 | 14 | 17 | 13 | 22 | 31 | 21 | 21 |
| 28 | 5o | 2o | 3- | 4- | 3+ | 2+ | 3o | 3o | 5222 | 2122 | 97 | 14 | 24 | 42 | 35 | 18 | 32 | 31 | 37 |
| 29 | 3+ | 3o | 2o | 3o | 5- | 4o | 4- | 4- | 4133 | 5336 | 35 | 28 | 15 | 29 | 73 | 53 | 45 | 50 | 41 |
| 30 | 4+ | 5- | 4- | 4+ | 4- | 5- | 4- | 3- | 4334 | 4734 | 70 | 74 | 49 | 62 | 49 | 75 | 42 | 21 | 55 |
| | | | | | | | | | | | | | | | | | | Monthly mean value of As | 28.7 |

**OCTOBER 1987**

| | Kn | | | | | | | | σn | | an | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3o | 2- | 3o | 3- | 2+ | 3o | 3- | 2o | 4333 | 5323 | 28 | 13 | 27 | 24 | 20 | 27 | 25 | 15 | 22 |
| 2 | 2+ | 2- | 2o | 3+ | 2+ | 1o | 2- | 1- | 3434 | 3221 | 20 | 13 | 14 | 37 | 17 | 6 | 11 | 5 | 15 |
| 3 | 1- | 2+ | 4o | 5- | 5o | 4o | 4o | 3o | 4332 | 2363 | 5 | 19 | 57 | 81 | 102 | 51 | 54 | 27 | 50 |
| 4 | 3- | 2+ | 3o | 4o | 4- | 2+ | 1+ | 1+ | 5344 | 3433 | 25 | 17 | 29 | 52 | 42 | 18 | 10 | 8 | 25 |
| 5 | 1o | 2- | 1+ | 3- | 2- | 2- | 1o | 1+ | 2234 | 3312 | 7 | 12 | 10 | 21 | 12 | 12 | 7 | 10 | 11 |
| 6 | 1- | 1+ | 2- | 2- | 1- | 1+ | 2- | 2- | 1224 | 1233 | 4 | 8 | 11 | 12 | 5 | 8 | 13 | 11 | 9 |
| 7 | 0+ | 1- | 2- | 2o | 4o | 2o | 1o | 1+ | 2133 | 2223 | 3 | 5 | 12 | 16 | 54 | 15 | 7 | 9 | 15 |
| 8 | 3- | 2- | 2- | 3- | 2o | 2- | 2o | 1o | 4233 | 2113 | 21 | 11 | 13 | 21 | 14 | 13 | 14 | 7 | 14 |
| 9 | 0+ | 1- | 1- | 0+ | 0o | 0+ | 2o | 2+ | 2112 | 1124 | 2 | 5 | 5 | 2 | 1 | 2 | 15 | 17 | 6 |
| 10 | 3- | 3- | 2- | 1- | 1+ | 2- | 2o | 2- | 5232 | 1122 | 21 | 21 | 11 | 4 | 8 | 11 | 14 | 12 | 13 |
| 11 | 2+ | 3+ | 4- | 3- | 4- | 5+ | 4+ | 4- | 2443 | 3533 | 20 | 35 | 41 | 25 | 46 | 107 | 67 | 41 | 48 |
| 12 | 2o | 2o | 1o | 1- | 3- | 3o | 2o | 2+ | 1112 | 2314 | 14 | 14 | 7 | 5 | 21 | 27 | 15 | 19 | 15 |
| 13 | 3- | 2o | 3- | 3o | 4o | 4o | 4o | 4- | 2022 | 2133 | 22 | 14 | 24 | 27 | 51 | 54 | 59 | 46 | 37 |
| 14 | 4- | 3o | 4- | 4- | 3+ | 5- | 3+ | 3- | 3133 | 3333 | 46 | 32 | 50 | 43 | 37 | 74 | 38 | 22 | 43 |
| 15 | 3- | 4- | 4- | 4o | 4- | 4- | 3+ | 2o | 2322 | 3232 | 21 | 48 | 47 | 59 | 43 | 50 | 34 | 16 | 40 |
| 16 | 2o | 3- | 4- | 2- | 3- | 3o | 3- | 2o | 3432 | 2232 | 14 | 22 | 42 | 13 | 23 | 27 | 21 | 16 | 22 |
| 17 | 2o | 1o | 2- | 3o | 5- | 4- | 3o | 3- | 0322 | 3323 | 14 | 7 | 12 | 33 | 85 | 46 | 32 | 25 | 32 |
| 18 | 2- | 1+ | 1o | 2- | 1+ | 1+ | 1- | 0+ | 1421 | 3122 | 11 | 10 | 6 | 13 | 9 | 9 | 4 | 3 | 8 |
| 19 | 1- | 1- | 0+ | 2o | 2+ | 2+ | 1+ | 1+ | 2313 | 1224 | 5 | 5 | 2 | 14 | 19 | 17 | 8 | 8 | 10 |
| 20 | 0+ | 1- | 1o | 1o | 2o | 2+ | 2o | 3+ | 2123 | 2533 | 3 | 5 | 7 | 6 | 14 | 19 | 15 | 40 | 14 |
| 21 | 3- | 2o | 2- | 2o | 3- | 3o | 4o | 2- | 3521 | 5442 | 26 | 16 | 12 | 15 | 23 | 32 | 53 | 11 | 24 |
| 22 | 1o | 1o | 1- | 1o | 1o | 1+ | 2+ | 3- | 0112 | 1223 | 6 | 7 | 5 | 6 | 6 | 8 | 17 | 23 | 10 |
| 23 | 3- | 3- | 2- | 2+ | 2+ | 4- | 1+ | 1- | 4233 | 3531 | 26 | 23 | 13 | 18 | 17 | 41 | 8 | 4 | 19 |
| 24 | 2- | 2- | 3- | 3o | 2o | 3- | 5- | 4o | 5244 | 1233 | 12 | 12 | 21 | 32 | 15 | 22 | 83 | 51 | 31 |
| 25 | 4- | 4+ | 4o | 4+ | 4- | 2o | 2+ | 3- | 3435 | 5143 | 43 | 62 | 52 | 69 | 50 | 14 | 20 | 24 | 42 |
| 26 | 1+ | 3- | 3o | 3+ | 3- | 3- | 1+ | 2- | 1233 | 2533 | 8 | 21 | 28 | 36 | 25 | 22 | 9 | 13 | 20 |
| 27 | 3+ | 3- | 4+ | 4+ | 4+ | 5- | 5- | 4+ | 2265 | 4454 | 39 | 23 | 63 | 63 | 68 | 86 | 79 | 63 | 61 |
| 28 | 5- | 5- | 5- | 5o | 4+ | 5- | 4o | 3- | 4144 | 4653 | 79 | 74 | 78 | 90 | 65 | 86 | 57 | 26 | 69 |
| 29 | 3+ | 3+ | 3- | 3+ | 4- | 3- | 3o | 2+ | 2413 | 3212 | 35 | 34 | 26 | 39 | 43 | 22 | 28 | 19 | 31 |
| 30 | 2+ | 3o | 3o | 4- | 3- | 1+ | 2+ | 2o | 4533 | 3322 | 18 | 31 | 30 | 48 | 23 | 10 | 17 | 16 | 24 |
| 31 | 1+ | 2- | 2+ | 3- | 3- | 3- | 3+ | 2- | 3523 | 4241 | 8 | 13 | 20 | 24 | 21 | 23 | 34 | 13 | 20 |
| | | | | | | | | | | | Monthly mean value of An | | | | | | | | 25.8 |

**OCTOBER 1987**

| | Ks | | | | | | | | σs | | as | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3- | 2- | 3- | 3- | 2o | 3- | 2+ | 2o | 3232 | 4236 | 26 | 12 | 21 | 21 | 15 | 21 | 19 | 15 | 19 |
| 2 | 2+ | 1+ | 2- | 3+ | 2- | 1- | 1+ | 0+ | 3443 | 4213 | 19 | 10 | 12 | 35 | 13 | 5 | 8 | 3 | 13 |
| 3 | 0+ | 2+ | 3+ | 4o | 5+ | 4+ | 5+ | 3+ | 2421 | 1653 | 3 | 17 | 40 | 53 | 106 | 69 | 112 | 35 | 54 |
| 4 | 3- | 2- | 2+ | 3+ | 4- | 2- | 1o | 1o | 3254 | 3251 | 21 | 11 | 18 | 37 | 44 | 13 | 6 | 6 | 20 |
| 5 | 1- | 1+ | 1o | 2o | 1+ | 1+ | 1o | 1+ | 2315 | 2121 | 4 | 10 | 6 | 14 | 10 | 8 | 6 | 8 | 8 |
| 6 | 1- | 1o | 1+ | 1+ | 0o | 1o | 2- | 2- | 1233 | 1253 | 4 | 7 | 10 | 10 | 1 | 6 | 11 | 12 | 8 |
| 7 | 0o | 1o | 1+ | 2+ | 4o | 1+ | 1o | 1+ | 2232 | 1213 | 1 | 7 | 10 | 18 | 51 | 8 | 6 | 9 | 14 |
| 8 | 3- | 2- | 2o | 3o | 2- | 1+ | 2o | 1o | 4433 | 1213 | 23 | 13 | 16 | 28 | 13 | 10 | 14 | 7 | 16 |
| 9 | 0+ | 1- | 1- | 0o | 0o | 0o | 2- | 2- | 1201 | 0042 | 3 | 5 | 4 | 1 | 0 | 0 | 13 | 12 | 5 |
| 10 | 2+ | 2o | 1o | 1- | 1- | 1+ | 2+ | 1+ | 4211 | 1311 | 20 | 16 | 6 | 5 | 5 | 9 | 17 | 10 | 11 |
| 11 | 3o | 3o | 3o | 3o | 4- | 5+ | 5- | 3+ | 1242 | 4443 | 27 | 31 | 29 | 27 | 47 | 112 | 77 | 36 | 48 |
| 12 | 2- | 2o | 1o | 0+ | 3- | 3- | 2- | 2+ | 2412 | 2212 | 12 | 14 | 6 | 3 | 22 | 25 | 13 | 19 | 14 |
| 13 | 3- | 2- | 3- | 3- | 4o | 4- | 4+ | 4o | 2122 | 1334 | 22 | 13 | 21 | 23 | 56 | 49 | 69 | 55 | 39 |
| 14 | 4o | 3o | 3+ | 4o | 3+ | 4+ | 3+ | 3- | 5133 | 1442 | 57 | 30 | 40 | 52 | 34 | 64 | 40 | 25 | 43 |
| 15 | 3o | 4- | 3+ | 4o | 4- | 4- | 3o | 2- | 1423 | 2242 | 29 | 48 | 35 | 53 | 48 | 44 | 33 | 13 | 38 |
| 16 | 2- | 2+ | 3- | 2- | 2+ | 4- | 2+ | 2- | 1323 | 1242 | 13 | 19 | 23 | 12 | 19 | 41 | 17 | 11 | 19 |
| 17 | 2- | 1- | 1+ | 3+ | 5- | 4- | 3o | 3- | 2211 | 2222 | 11 | 5 | 9 | 36 | 84 | 44 | 32 | 24 | 31 |
| 18 | 2- | 1o | 1+ | 1+ | 1+ | 1- | 0+ | 0o | 3113 | 2321 | 11 | 6 | 8 | 9 | 8 | 5 | 3 | 1 | 6 |
| 19 | 1o | 1o | 0o | 2+ | 2+ | 2o | 1+ | 2- | 1313 | 4215 | 6 | 6 | 1 | 18 | 19 | 14 | 8 | 11 | 10 |
| 20 | 1- | 1o | 1- | 1+ | 2- | 2o | 2- | 3+ | 4114 | 3134 | 4 | 6 | 5 | 8 | 13 | 14 | 13 | 40 | 13 |
| 21 | 2+ | 2- | 2- | 2+ | 2+ | 3o | 4+ | 1+ | 2241 | 2451 | 19 | 11 | 11 | 17 | 17 | 30 | 65 | 9 | 22 |
| 22 | 1+ | 1+ | 1+ | 1o | 1- | 1o | 2+ | 3- | 1320 | 2233 | 8 | 9 | 8 | 7 | 4 | 7 | 18 | 25 | 11 |
| 23 | 3- | 3- | 1+ | 2+ | 2- | 3+ | 0+ | 0+ | 4311 | 2321 | 21 | 21 | 9 | 17 | 12 | 35 | 3 | 2 | 15 |
| 24 | 2- | 2- | 2- | 3- | 2+ | 3- | 5- | 4- | 4245 | 2245 | 13 | 13 | 11 | 22 | 19 | 24 | 83 | 50 | 29 |
| 25 | 4o | 4o | 3o | 4- | 3+ | 1+ | 2+ | 3- | 4315 | 3335 | 51 | 52 | 30 | 50 | 37 | 9 | 17 | 23 | 34 |
| 26 | 1o | 2+ | 3o | 3o | 3o | 2+ | 1o | 1+ | 1512 | 3422 | 6 | 17 | 28 | 32 | 29 | 17 | 6 | 10 | 18 |
| 27 | 3o | 3- | 4- | 4+ | 4o | 4o | 5- | 5- | 3254 | 3223 | 31 | 23 | 48 | 65 | 56 | 58 | 74 | 73 | 54 |
| 28 | 6- | 4+ | 4- | 4+ | 4o | 5- | 4+ | 3- | 3333 | 3542 | 121 | 67 | 49 | 69 | 54 | 78 | 63 | 23 | 66 |
| 29 | 3o | 3- | 2+ | 3- | 3+ | 2+ | 3- | 3- | 3312 | 4134 | 31 | 25 | 18 | 21 | 35 | 17 | 24 | 21 | 24 |
| 30 | 3- | 2+ | 3- | 3o | 2+ | 1o | 2+ | 2o | 4324 | 3232 | 21 | 20 | 26 | 27 | 18 | 6 | 17 | 16 | 19 |
| 31 | 1o | 2- | 2+ | 2+ | 2+ | 2o | 3o | 2o | 3223 | 1121 | 7 | 13 | 19 | 19 | 20 | 14 | 29 | 14 | 17 |
| | | | | | | | | | | | Monthly mean value of As | | | | | | | | 23.8 |

**NOVEMBER 1987**

| | Kn | | | | | | | | σn | | an | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2+ | 2+ | 2+ | 2+ | 2+ | 2+ | 1+ | 1- | 7533 | 4433 | 17 | 17 | 17 | 17 | 18 | 20 | 8 | 4 | 15 |
| 2 | 2- | 2- | 3- | 2o | 3- | 4+ | 5o | 4+ | 3351 | 4355 | 12 | 11 | 22 | 15 | 26 | 62 | 93 | 69 | 39 |
| 3 | 4- | 3- | 2+ | 3- | 4- | 5- | 5o | 4o | 5251 | 3274 | 43 | 22 | 19 | 21 | 41 | 71 | 90 | 51 | 45 |
| 4 | 3- | 2o | 2- | 1o | 2o | 1+ | 2- | 2o | 2133 | 1312 | 24 | 15 | 13 | 7 | 16 | 8 | 13 | 15 | 14 |
| 5 | 1o | 1- | 2o | 2+ | 2- | 3- | 3- | 3+ | 4113 | 3322 | 6 | 5 | 14 | 20 | 11 | 26 | 23 | 35 | 18 |
| 6 | 2- | 3- | 2- | 2+ | 3- | 2- | 2+ | 2- | 5423 | 2221 | 13 | 24 | 11 | 19 | 21 | 13 | 17 | 13 | 16 |
| 7 | 1+ | 3o | 1+ | 1o | 1o | 1+ | 0+ | 1o | 2221 | 1332 | 8 | 27 | 10 | 7 | 7 | 9 | 3 | 7 | 10 |
| 8 | 1o | 1o | 2- | 1o | 2- | 1o | 1- | 0+ | 3120 | 2333 | 6 | 6 | 11 | 6 | 11 | 7 | 5 | 2 | 7 |
| 9 | 0+ | 1- | 1+ | 2- | 2+ | 2o | 2o | 4o | 2232 | 2144 | 2 | 4 | 10 | 12 | 20 | 15 | 16 | 53 | 17 |
| 10 | 3o | 2+ | 3- | 3- | 2+ | 1+ | 1+ | 2o | 5233 | 3131 | 30 | 20 | 22 | 26 | 19 | 9 | 9 | 16 | 19 |
| 11 | 2o | 2+ | 3o | 3- | 2o | 2+ | 2+ | 3+ | 4333 | 1232 | 14 | 17 | 29 | 23 | 14 | 17 | 17 | 37 | 21 |
| 12 | 4o | 2o | 4- | 3o | 2o | 2o | 3+ | 4- | 5252 | 2322 | 56 | 16 | 45 | 28 | 14 | 16 | 38 | 45 | 32 |
| 13 | 4- | 3o | 3o | 4- | 4+ | 4+ | 3- | 3+ | 3223 | 4534 | 43 | 29 | 30 | 43 | 64 | 68 | 22 | 37 | 42 |
| 14 | 3o | 4- | 3- | 4- | 3+ | 4o | 3o | 3- | 4313 | 3312 | 27 | 44 | 23 | 45 | 38 | 55 | 32 | 23 | 36 |
| 15 | 3o | 2o | 2+ | 3- | 2+ | 3- | 3- | 2+ | 3221 | 3333 | 27 | 14 | 20 | 24 | 20 | 21 | 23 | 19 | 21 |
| 16 | 2+ | 3- | 1+ | 1+ | 1+ | 2+ | 1+ | 1+ | 5423 | 2433 | 17 | 22 | 10 | 10 | 9 | 17 | 10 | 8 | 13 |
| 17 | 1o | 0+ | 0+ | 0+ | 0+ | 1- | 0+ | 0+ | 2222 | 1113 | 6 | 3 | 2 | 3 | 3 | 4 | 3 | 2 | 3 |
| 18 | 1- | 1+ | 1o | 0+ | 1+ | 1o | 1+ | 2+ | 2332 | 2243 | 5 | 9 | 7 | 3 | 9 | 7 | 10 | 17 | 8 |
| 19 | 1+ | 3- | 3- | 3- | 2+ | 3o | 2o | 1+ | 4523 | 3522 | 9 | 21 | 25 | 26 | 20 | 32 | 14 | 8 | 19 |
| 20 | 2- | 2o | 3o | 2o | 2o | 3- | 3- | 2- | 2231 | 2631 | 11 | 16 | 30 | 15 | 14 | 26 | 24 | 12 | 19 |
| 21 | 2o | 2+ | 2- | 2+ | 1+ | 1- | 2- | 0+ | 4424 | 2141 | 14 | 18 | 13 | 19 | 10 | 4 | 11 | 2 | 11 |
| 22 | 2- | 2+ | 2- | 2+ | 2- | 2- | 2o | 2- | 3534 | 3454 | 11 | 17 | 11 | 17 | 11 | 11 | 14 | 13 | 13 |
| 23 | 2- | 2+ | 5- | 5- | 5+ | 3+ | 5+ | 4- | 4454 | 4254 | 11 | 18 | 76 | 71 | 111 | 36 | 110 | 47 | 60 |
| 24 | 3+ | 3o | 3+ | 5- | 5- | 4- | 2+ | 3- | 5453 | 4533 | 38 | 28 | 38 | 76 | 73 | 46 | 20 | 25 | 43 |
| 25 | 2- | 2+ | 3- | 2- | 4- | 3+ | 2o | 2o | 3422 | 4532 | 11 | 19 | 25 | 11 | 42 | 34 | 15 | 15 | 22 |
| 26 | 3- | 3o | 2+ | 3- | 3+ | 4- | 2+ | 3o | 4633 | 2424 | 21 | 30 | 17 | 21 | 38 | 48 | 18 | 30 | 28 |
| 27 | 3- | 3- | 4o | 3+ | 4- | 4- | 2+ | 2+ | 4253 | 3323 | 22 | 24 | 54 | 40 | 47 | 47 | 18 | 17 | 34 |
| 28 | 1+ | 2- | 2o | 4- | 2+ | 3- | 2+ | 2- | 3314 | 3242 | 10 | 11 | 14 | 42 | 17 | 23 | 20 | 11 | 19 |
| 29 | 1+ | 1o | 0+ | 1o | 1- | 1+ | 1o | 0o | 3221 | 2121 | 10 | 6 | 3 | 7 | 5 | 8 | 6 | 1 | 6 |
| 30 | 0o | 0o | 0o | 1+ | 1- | 1+ | 2o | 1+ | 1012 | 2212 | 1 | 0 | 1 | 9 | 4 | 9 | 15 | 10 | 6 |
| | | | | | | | | | | | | | | | | | | Monthly mean value of An | 21.9 |

**NOVEMBER 1987**

| | Ks | | | | | | | | σs | | as | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 2- | 1+ | 2- | 1+ | 1+ | 1o | 1- | 6522 | 2222 | 14 | 11 | 9 | 13 | 9 | 10 | 6 | 4 | 10 |
| 2 | 2- | 2o | 2+ | 3- | 3- | 4+ | 5+ | 5- | 3142 | 4243 | 12 | 14 | 20 | 21 | 26 | 61 | 108 | 74 | 42 |
| 3 | 3o | 3o | 2o | 3- | 3+ | 4+ | 5+ | 4o | 5322 | 2153 | 33 | 31 | 15 | 23 | 37 | 69 | 112 | 54 | 47 |
| 4 | 3o | 2+ | 3- | 1o | 2o | 1+ | 2- | 3- | 2231 | 2222 | 31 | 18 | 21 | 6 | 16 | 8 | 13 | 22 | 17 |
| 5 | 1o | 1- | 2o | 3o | 2- | 3o | 3- | 3+ | 1211 | 3332 | 6 | 4 | 14 | 28 | 12 | 27 | 22 | 39 | 19 |
| 6 | 1+ | 3- | 2- | 2+ | 3- | 2- | 2+ | 2o | 3323 | 2221 | 10 | 21 | 12 | 20 | 23 | 13 | 17 | 14 | 16 |
| 7 | 2- | 3+ | 2- | 2- | 1o | 1o | 0+ | 1+ | 3322 | 1224 | 13 | 34 | 11 | 12 | 6 | 7 | 3 | 8 | 12 |
| 8 | 2- | 1+ | 2o | 1+ | 1+ | 1- | 1o | 1- | 3242 | 2331 | 11 | 10 | 14 | 10 | 8 | 5 | 7 | 5 | 9 |
| 9 | 0+ | 1- | 2- | 2o | 3- | 2- | 3- | 4- | 1121 | 2334 | 2 | 5 | 13 | 15 | 26 | 12 | 22 | 49 | 18 |
| 10 | 3o | 2+ | 3- | 3+ | 3- | 1o | 1+ | 2+ | 2323 | 2321 | 33 | 20 | 26 | 37 | 22 | 6 | 10 | 17 | 21 |
| 11 | 2o | 3- | 3+ | 3- | 2o | 2o | 3- | 3o | 3432 | 2223 | 15 | 24 | 39 | 21 | 16 | 16 | 25 | 28 | 23 |
| 12 | 4o | 2+ | 3+ | 3o | 2- | 2+ | 4o | 4+ | 6121 | 2422 | 51 | 17 | 36 | 30 | 13 | 19 | 59 | 67 | 37 |
| 13 | 3o | 3- | 3o | 3+ | 4- | 4o | 3- | 3o | 2202 | 4222 | 32 | 24 | 32 | 35 | 48 | 51 | 21 | 32 | 34 |
| 14 | 3o | 3+ | 2o | 3o | 3o | 4- | 3o | 3- | 2202 | 1222 | 32 | 34 | 16 | 33 | 27 | 44 | 27 | 23 | 30 |
| 15 | 3o | 2o | 2+ | 3o | 3- | 3- | 3- | 2+ | 3213 | 2244 | 33 | 15 | 19 | 28 | 22 | 23 | 21 | 20 | 23 |
| 16 | 2o | 2o | 1o | 1+ | 1o | 2o | 1o | 1+ | 1022 | 3222 | 14 | 16 | 6 | 9 | 7 | 15 | 6 | 8 | 10 |
| 17 | 1o | 1o | 1- | 0o | 0o | 0+ | 0+ | 0+ | 3221 | 0122 | 7 | 7 | 4 | 1 | 0 | 2 | 2 | 3 | 3 |
| 18 | 1- | 1+ | 1+ | 0+ | 1o | 1+ | 2o | 3- | 2321 | 3312 | 5 | 10 | 8 | 2 | 6 | 9 | 14 | 22 | 10 |
| 19 | 2- | 3- | 2+ | 3- | 3- | 3- | 2- | 1+ | 2233 | 1233 | 12 | 22 | 20 | 25 | 21 | 23 | 13 | 9 | 18 |
| 20 | 2+ | 3- | 3- | 2o | 2- | 3- | 3- | 2o | 3222 | 2321 | 17 | 26 | 22 | 14 | 13 | 21 | 24 | 14 | 19 |
| 21 | 1+ | 2- | 2o | 2- | 1o | 1- | 2- | 1- | 4312 | 2443 | 10 | 12 | 14 | 11 | 7 | 4 | 11 | 4 | 9 |
| 22 | 2- | 2o | 2+ | 2- | 1+ | 1+ | 1+ | 1+ | 1243 | 1322 | 12 | 14 | 19 | 12 | 9 | 8 | 9 | 10 | 12 |
| 23 | 1+ | 2o | 4o | 5o | 5- | 3+ | 5- | 4- | 1351 | 2133 | 10 | 15 | 60 | 94 | 81 | 36 | 86 | 46 | 54 |
| 24 | 3o | 3- | 3+ | 4o | 4- | 3o | 3- | 3- | 1123 | 2322 | 33 | 25 | 34 | 58 | 48 | 32 | 21 | 25 | 35 |
| 25 | 2+ | 2+ | 2o | 2- | 3+ | 3- | 2- | 2- | 3421 | 5421 | 17 | 18 | 15 | 12 | 40 | 26 | 11 | 11 | 19 |
| 26 | 2o | 2+ | 2o | 3- | 3o | 3+ | 2o | 3+ | 3442 | 0224 | 14 | 17 | 14 | 25 | 32 | 37 | 16 | 34 | 24 |
| 27 | 3- | 2+ | 3o | 3+ | 4- | 4- | 3- | 2+ | 4221 | 2223 | 22 | 19 | 33 | 39 | 42 | 41 | 25 | 20 | 30 |
| 28 | 2+ | 2- | 2o | 3- | 2o | 2- | 2+ | 2- | 1212 | 1332 | 17 | 12 | 14 | 22 | 14 | 13 | 17 | 13 | 15 |
| 29 | 2o | 2- | 1- | 2o | 1o | 1o | 1o | 0+ | 1333 | 1332 | 14 | 13 | 5 | 14 | 6 | 6 | 6 | 2 | 8 |
| 30 | 0o | 0o | 0o | 2- | 1+ | 1+ | 2o | 2o | 1121 | 1121 | 1 | 1 | 1 | 13 | 8 | 8 | 15 | 14 | 8 |
| | | | | | | | | | | | | | | | | | | Monthly mean value of As | 21.1 |

**DECEMBER 1987**

| | Kn | | | | | | | | σn | | an | | | | | | An |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1+ | 1o | 1o | 2- | 1+ | 1+ | 2- | 1o | 1133 | 1211 | 9 | 7 | 6 | 12 | 8 | 10 | 13 | 6 | 9 |
| 2 | 2- | 1+ | 1- | 0+ | 2- | 2o | 1+ | 1o | 3422 | 2121 | 11 | 8 | 5 | 3 | 11 | 14 | 8 | 7 | 8 |
| 3 | 2+ | 3o | 2+ | 2- | 2- | 4- | 2o | 2+ | 3643 | 1313 | 17 | 30 | 18 | 13 | 13 | 49 | 14 | 20 | 22 |
| 4 | 2- | 1- | 1o | 0+ | 1o | 2+ | 3- | 4o | 2242 | 1422 | 11 | 5 | 6 | 3 | 7 | 17 | 24 | 56 | 16 |
| 5 | 3+ | 3o | 4- | 3o | 3- | 3- | 3o | 2- | 3433 | 3222 | 38 | 27 | 41 | 33 | 23 | 23 | 29 | 11 | 28 |
| 6 | 1- | 2- | 2- | 1o | 2- | 2+ | 2o | 2+ | 2631 | 2323 | 4 | 12 | 11 | 6 | 13 | 20 | 15 | 19 | 13 |
| 7 | 1+ | 1o | 1- | 1- | 1+ | 2- | 1+ | 0o | 2122 | 3231 | 10 | 7 | 5 | 4 | 10 | 11 | 8 | 1 | 7 |
| 8 | 0o | 0o | 0o | 0o | 1- | 0+ | 1- | 0+ | 1001 | 2232 | 1 | 0 | 0 | 1 | 4 | 2 | 4 | 3 | 2 |
| 9 | 1- | 0+ | 0+ | 1o | 1+ | 1o | 3- | 3+ | 3334 | 4522 | 4 | 3 | 3 | 6 | 8 | 6 | 26 | 34 | 11 |
| 10 | 2+ | 2- | 2o | 3o | 4- | 5- | 5- | 3+ | 3334 | 7976 | 17 | 12 | 15 | 27 | 45 | 73 | 83 | 37 | 39 |
| 11 | 4- | 2+ | 1o | 1+ | 2+ | 3o | 3o | 2+ | 6423 | 4675 | 49 | 18 | 7 | 9 | 18 | 30 | 28 | 20 | 22 |
| 12 | 2+ | 2+ | 2- | 2+ | 2+ | 2- | 1o | 0+ | 3334 | 4221 | 17 | 19 | 13 | 19 | 17 | 11 | 7 | 3 | 13 |
| 13 | 1- | 0+ | 1o | 1- | 1o | 2- | 1o | 1o | 1212 | 1423 | 4 | 2 | 7 | 5 | 6 | 11 | 6 | 6 | 6 |
| 14 | 1- | 0+ | 1o | 1- | 1+ | 1o | 1o | 1+ | 1221 | 5444 | 5 | 3 | 6 | 5 | 9 | 7 | 6 | 10 | 6 |
| 15 | 0o | 0o | 1- | 1o | 2o | 4o | 4- | 3- | 1222 | 4654 | 1 | 1 | 4 | 6 | 14 | 53 | 41 | 22 | 18 |
| 16 | 4o | 4o | 4+ | 4o | 4+ | 4o | 3- | 3+ | 6577 | 8857 | 54 | 54 | 61 | 51 | 62 | 56 | 24 | 37 | 50 |
| 17 | 2+ | 3o | 1o | 3- | 3+ | 3- | 3- | 3o | 4524 | 8546 | 19 | 29 | 7 | 25 | 40 | 23 | 24 | 27 | 24 |
| 18 | 3- | 2o | 2o | 2- | 1+ | 1o | 1- | 1o | 5223 | 2213 | 23 | 16 | 15 | 13 | 9 | 6 | 4 | 7 | 12 |
| 19 | 0+ | 1+ | 1o | 3- | 2o | 2- | 3- | 1+ | 2435 | 2364 | 2 | 8 | 7 | 23 | 15 | 12 | 25 | 8 | 13 |
| 20 | 0+ | 1o | 1- | 1+ | 2+ | 2- | 1+ | 0+ | 1323 | 5431 | 3 | 7 | 5 | 10 | 18 | 11 | 10 | 2 | 8 |
| 21 | 0+ | 2o | 1o | 2+ | 3- | 2o | 3o | 3o | 2324 | 4455 | 3 | 14 | 7 | 18 | 21 | 16 | 32 | 32 | 18 |
| 22 | 3+ | 3- | 3- | 3- | 3o | 3- | 4- | 4- | 6454 | 5656 | 34 | 22 | 23 | 24 | 33 | 25 | 44 | 47 | 32 |
| 23 | 2+ | 3- | 2o | 2o | 2+ | 2+ | 1+ | 0+ | 4633 | 4532 | 20 | 22 | 14 | 16 | 18 | 17 | 8 | 3 | 15 |
| 24 | 1- | 1+ | 1+ | 2o | 2- | 2o | 1+ | 2- | 2244 | 3444 | 4 | 9 | 10 | 16 | 12 | 14 | 10 | 13 | 11 |
| 25 | 1o | 2- | 1+ | 2o | 2o | 1o | 1o | 2+ | 3535 | 4246 | 7 | 12 | 9 | 14 | 14 | 7 | 7 | 20 | 11 |
| 26 | 1o | 1+ | 0o | 1+ | 1+ | 1o | 1- | 0+ | 2323 | 3312 | 7 | 10 | 1 | 10 | 8 | 7 | 4 | 3 | 6 |
| 27 | 0+ | 0o | 0o | 0+ | 0o | 0+ | 1- | 0o | 2011 | 1121 | 3 | 0 | 0 | 2 | 1 | 3 | 4 | 1 | 2 |
| 28 | 0o | 0o | 0+ | 0+ | 1- | 0o | 2- | 1o | 0022 | 1153 | 0 | 0 | 2 | 3 | 5 | 1 | 11 | 6 | 4 |
| 29 | 1+ | 1+ | 2- | 1o | 0+ | 0+ | 0+ | 1o | 3222 | 1111 | 10 | 10 | 11 | 6 | 3 | 2 | 3 | 6 | 6 |
| 30 | 0+ | 0+ | 1- | 1+ | 1- | 0+ | 0+ | 0o | 2132 | 2131 | 3 | 3 | 5 | 8 | 5 | 2 | 2 | 1 | 4 |
| 31 | 0+ | 1- | 1o | 1+ | 1+ | 1+ | 2- | 1+ | 2213 | 3334 | 2 | 4 | 6 | 9 | 8 | 9 | 11 | 9 | 7 |
| | | | | | | | | | | | Monthly mean value of An | | | | | | | | 14.3 |

**DECEMBER 1987**

| | Ks | | | | | | | | σs | | as | | | | | | As |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2- | 2- | 1+ | 2o | 1+ | 1o | 2+ | 1+ | 2232 | 1224 | 12 | 13 | 9 | 15 | 10 | 7 | 17 | 9 | 12 |
| 2 | 3- | 1+ | 1+ | 0+ | 2o | 2o | 1+ | 1o | 3122 | 2223 | 22 | 9 | 9 | 3 | 16 | 15 | 9 | 6 | 11 |
| 3 | 2+ | 3o | 2+ | 2o | 3- | 4- | 2+ | 2+ | 2332 | 3233 | 18 | 29 | 17 | 15 | 23 | 44 | 17 | 19 | 23 |
| 4 | 1+ | 1o | 1o | 1- | 1+ | 3- | 3- | 4o | 2223 | 1213 | 10 | 7 | 6 | 5 | 8 | 21 | 25 | 57 | 17 |
| 5 | 3+ | 3+ | 4o | 4- | 3- | 3- | 3o | 1+ | 1512 | 2131 | 34 | 35 | 56 | 41 | 23 | 25 | 31 | 10 | 32 |
| 6 | 1- | 1+ | 1+ | 1o | 2+ | 2o | 2- | 3- | 2242 | 1222 | 4 | 10 | 9 | 7 | 18 | 16 | 13 | 25 | 13 |
| 7 | 2- | 1+ | 1o | 0+ | 1o | 1+ | 1o | 0o | 2121 | 1221 | 11 | 9 | 7 | 2 | 6 | 8 | 6 | 1 | 6 |
| 8 | 1- | 0+ | 0+ | 0o | 0+ | 0o | 0o | 0+ | 1221 | 3012 | 4 | 3 | 2 | 1 | 2 | 0 | 1 | 3 | 2 |
| 9 | 1o | 1- | 0o | 1o | 0+ | 1- | 3+ | 4+ | 2312 | 2342 | 7 | 5 | 1 | 6 | 3 | 4 | 37 | 69 | 17 |
| 10 | 3o | 3o | 3- | 3+ | 4o | 4+ | 5- | 4- | 3221 | 1232 | 31 | 28 | 23 | 36 | 53 | 70 | 84 | 41 | 46 |
| 11 | 4+ | 3- | 1o | 2- | 3- | 3o | 3+ | 3- | 2222 | 2142 | 70 | 23 | 7 | 13 | 21 | 27 | 38 | 26 | 28 |
| 12 | 3o | 3- | 2o | 3o | 2+ | 1+ | 1+ | 1- | 1121 | 1311 | 29 | 25 | 16 | 27 | 18 | 9 | 8 | 4 | 17 |
| 13 | 1- | 1- | 1o | 1- | 1- | 1+ | 1o | 1- | 1212 | 2213 | 5 | 4 | 6 | 5 | 4 | 10 | 6 | 4 | 6 |
| 14 | 1o | 1+ | 1o | 1o | 1+ | 1- | 1+ | 1+ | 2222 | 3213 | 7 | 10 | 6 | 6 | 9 | 5 | 9 | 9 | 8 |
| 15 | 1- | 0+ | 1o | 1+ | 2o | 4- | 3+ | 3o | 1232 | 2332 | 5 | 2 | 7 | 8 | 15 | 43 | 40 | 33 | 19 |
| 16 | 4+ | 4+ | 4- | 4o | 4- | 4o | 3o | 3+ | 2232 | 3534 | 64 | 64 | 47 | 56 | 47 | 57 | 29 | 36 | 50 |
| 17 | 2+ | 2+ | 2- | 3o | 4- | 3- | 2+ | 3- | 2323 | 4233 | 18 | 19 | 11 | 28 | 45 | 26 | 19 | 21 | 23 |
| 18 | 2+ | 2o | 2- | 2- | 1+ | 1- | 1- | 0+ | 3412 | 2332 | 18 | 16 | 12 | 12 | 8 | 5 | 4 | 3 | 10 |
| 19 | 1o | 1o | 1+ | 3- | 2o | 2- | 2+ | 1o | 1123 | 2252 | 6 | 6 | 8 | 21 | 15 | 13 | 19 | 7 | 12 |
| 20 | 1- | 1o | 1o | 1+ | 2o | 1+ | 1+ | 0o | 2322 | 3231 | 4 | 6 | 6 | 9 | 14 | 9 | 8 | 1 | 7 |
| 21 | 1+ | 2o | 1+ | 2o | 2+ | 2+ | 3o | 2+ | 2442 | 1332 | 8 | 16 | 10 | 15 | 17 | 18 | 27 | 20 | 16 |
| 22 | 3+ | 2+ | 2+ | 3o | 3o | 3- | 4- | 3+ | 3322 | 0233 | 40 | 19 | 18 | 30 | 32 | 24 | 41 | 38 | 30 |
| 23 | 2o | 3o | 2+ | 2- | 3- | 2+ | 1+ | 0+ | 2332 | 2210 | 15 | 29 | 19 | 13 | 21 | 20 | 10 | 3 | 16 |
| 24 | 1+ | 2o | 2- | 2o | 2- | 2- | 1+ | 2+ | 1242 | 2321 | 8 | 15 | 11 | 15 | 13 | 13 | 10 | 17 | 13 |
| 25 | 2- | 2- | 2o | 2o | 2+ | 1+ | 1o | 3- | 2212 | 4323 | 11 | 13 | 14 | 15 | 18 | 9 | 7 | 21 | 14 |
| 26 | 2- | 1+ | 1- | 1+ | 1+ | 1+ | 1o | 1- | 2322 | 1343 | 12 | 9 | 4 | 10 | 8 | 8 | 7 | 5 | 8 |
| 27 | 1- | 1- | 0+ | 0o | 0o | 0o | 0+ | 0o | 1321 | 0011 | 5 | 4 | 2 | 1 | 0 | 0 | 2 | 1 | 2 |
| 28 | 0o | 0+ | 0+ | 0+ | 1- | 0o | 2- | 2- | 1202 | 2152 | 1 | 3 | 3 | 3 | 5 | 1 | 13 | 12 | 5 |
| 29 | 1+ | 2+ | 2+ | 1+ | 1- | 0o | 1- | 1+ | 3332 | 2121 | 9 | 17 | 18 | 9 | 4 | 1 | 5 | 8 | 9 |
| 30 | 1o | 0+ | 1+ | 1+ | 1o | 0+ | 0+ | 0+ | 3231 | 2322 | 6 | 3 | 9 | 10 | 7 | 2 | 3 | 2 | 5 |
| 31 | 1o | 1o | 1o | 2- | 2o | 1o | 2+ | 1+ | 3123 | 1333 | 6 | 7 | 6 | 13 | 14 | 6 | 17 | 8 | 10 |
| | | | | | | | | | | | Monthly mean value of As | | | | | | | | 15.7 |

**JANUARY 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 3- | 3o | 3o | 3+ | 3+ | 4- | 3o | 24.0 | 16 | 23 | 32 | 33 | 36 | 37 | 44 | 27 | 31 | 22 |
| 2 | 1o | 2+ | 2+ | 2- | 3+ | 3- | 2- | 2o | 17.0 | 6 | 18 | 18 | 13 | 40 | 25 | 11 | 14 | 18 | 22 |
| 3 | 2+ | 2- | 2- | 2- | 2- | 1- | 1+ | 1+ | 12.3 | 18 | 13 | 13 | 13 | 11 | 5 | 8 | 8 | 11 | 12 |
| 4 | 1o | 1o | 0+ | 0o | 0o | 1- | 1+ | 1+ | 5.7 | 7 | 6 | 2 | 1 | 0 | 5 | 8 | 8 | 5 | 6 |
| 5 | 1+ | 1- | 1- | 0+ | 0o | 1+ | 2- | 1o | 7.0 | 9 | 4 | 4 | 2 | 0 | 9 | 11 | 7 | 6 | 6 |
| 6 | 1o | 1+ | 1- | 1o | 1o | 1- | 1- | 1o | 7.3 | 7 | 8 | 4 | 6 | 6 | 4 | 5 | 6 | 6 | 6 |
| 7 | 1+ | 1o | 1o | 0+ | 0o | 1o | 2- | 2+ | 8.7 | 9 | 7 | 7 | 3 | 1 | 7 | 11 | 20 | 8 | 8 |
| 8 | 2o | 1o | 2- | 2- | 2+ | 2o | 2- | 2- | 14.0 | 14 | 7 | 13 | 13 | 17 | 15 | 13 | 11 | 13 | 15 |
| 9 | 1+ | 2+ | 3+ | 3+ | 3- | 2- | 1o | 1- | 16.3 | 10 | 17 | 35 | 35 | 21 | 12 | 6 | 4 | 18 | 15 |
| 10 | 1- | 1+ | 2+ | 2- | 2- | 1o | 1+ | 1+ | 11.3 | 4 | 10 | 17 | 11 | 11 | 7 | 8 | 8 | 10 | 9 |
| 11 | 0+ | 1+ | 1o | 1o | 1+ | 1+ | 2o | 2o | 10.3 | 3 | 9 | 7 | 6 | 8 | 10 | 14 | 16 | 9 | 11 |
| 12 | 2+ | 3- | 2+ | 2+ | 2- | 2- | 1+ | 1+ | 15.7 | 18 | 21 | 17 | 20 | 12 | 11 | 9 | 8 | 15 | 12 |
| 13 | 1o | 1o | 1+ | 1+ | 2- | 2+ | 2- | 1+ | 11.7 | 7 | 6 | 9 | 10 | 12 | 19 | 13 | 10 | 11 | 9 |
| 14 | 1- | 1- | 2- | 1- | 2- | 1o | 2- | 1- | 8.7 | 4 | 5 | 11 | 4 | 13 | 7 | 13 | 4 | 8 | 8 |
| 15 | 0+ | 1o | 1o | 1- | 1- | 1+ | 2+ | 3- | 10.0 | 2 | 6 | 7 | 4 | 4 | 8 | 20 | 21 | 9 | 11 |
| 16 | 2o | 1+ | 2- | 3- | 3o | 4- | 3- | 1o | 18.0 | 15 | 9 | 13 | 25 | 31 | 43 | 22 | 7 | 21 | 17 |
| 17 | 2+ | 2o | 1o | 1+ | 1+ | 2+ | 2o | 3o | 15.3 | 18 | 14 | 7 | 9 | 10 | 18 | 14 | 27 | 15 | 17 |
| 18 | 2o | 1- | 2- | 2o | 1- | 1+ | 1+ | 2+ | 12.0 | 14 | 5 | 12 | 16 | 4 | 8 | 10 | 19 | 11 | 13 |
| 19 | 1- | 1+ | 3- | 2+ | 2o | 2- | 2o | 2+ | 15.0 | 4 | 8 | 24 | 19 | 16 | 11 | 16 | 17 | 14 | 15 |
| 20 | 2- | 3- | 3o | 2+ | 3+ | 4o | 4- | 2+ | 23.0 | 11 | 24 | 29 | 19 | 34 | 59 | 41 | 18 | 29 | 22 |
| 21 | 1+ | 1+ | 2- | 3- | 3o | 2- | 2+ | 3- | 16.7 | 9 | 10 | 13 | 21 | 30 | 11 | 19 | 23 | 17 | 21 |
| 22 | 2- | 2- | 2- | 2- | 3- | 3- | 3o | 2+ | 17.3 | 11 | 11 | 12 | 11 | 21 | 21 | 32 | 19 | 17 | 18 |
| 23 | 2- | 2+ | 2- | 3o | 3- | 2- | 2- | 3- | 17.3 | 13 | 17 | 11 | 30 | 23 | 13 | 12 | 23 | 18 | 18 |
| 24 | 2- | 2o | 2o | 1+ | 1+ | 2- | 2- | 1o | 12.7 | 13 | 16 | 14 | 8 | 10 | 13 | 13 | 7 | 12 | 13 |
| 25 | 1- | 2o | 2- | 2- | 2- | 2o | 2- | 2o | 13.3 | 4 | 15 | 12 | 13 | 11 | 16 | 12 | 14 | 12 | 13 |
| 26 | 2o | 2o | 2+ | 2- | 2o | 2- | 1+ | 1- | 13.7 | 16 | 16 | 17 | 11 | 15 | 11 | 9 | 4 | 12 | 13 |
| 27 | 1o | 2- | 2- | 3o | 3- | 0+ | 1- | 1+ | 12.3 | 6 | 13 | 13 | 28 | 23 | 3 | 5 | 8 | 12 | 12 |
| 28 | 1+ | 2o | 2+ | 2- | 2o | 3o | 3o | 3o | 18.3 | 9 | 14 | 17 | 11 | 14 | 32 | 31 | 33 | 20 | 18 |
| 29 | 4- | 3- | 2- | 1o | 1+ | 1o | 1- | 2- | 13.7 | 49 | 21 | 11 | 7 | 9 | 7 | 4 | 11 | 15 | 15 |
| 30 | 2- | 0o | 0o | 0+ | 1+ | 2- | 1+ | 2- | 8.0 | 11 | 1 | 1 | 2 | 8 | 13 | 9 | 11 | 7 | 9 |
| 31 | 3- | 2o | 1+ | 1+ | 1+ | 1o | 1o | 1+ | 12.0 | 22 | 15 | 8 | 10 | 10 | 7 | 6 | 8 | 11 | 11 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | | 13.6 | |

**FEBRUARY 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 2- | 1o | 1+ | 2o | 2o | 1+ | 2- | 13.0 | 15 | 13 | 7 | 9 | 16 | 16 | 9 | 12 | 12 | 10 |
| 2 | 1+ | 1- | 1- | 1+ | 1+ | 2o | 1o | 1o | 9.3 | 8 | 4 | 5 | 8 | 9 | 15 | 7 | 6 | 8 | 10 |
| 3 | 1+ | 1+ | 2- | 1+ | 1- | 0+ | 1- | 1o | 8.3 | 9 | 8 | 12 | 9 | 4 | 3 | 5 | 6 | 7 | 7 |
| 4 | 1- | 1- | 0+ | 1o | 2- | 2+ | 2+ | 0+ | 9.3 | 5 | 4 | 3 | 6 | 11 | 20 | 17 | 3 | 9 | 7 |
| 5 | 1- | 1- | 1o | 2o | 1o | 2- | 1- | 2- | 9.3 | 5 | 4 | 7 | 14 | 6 | 13 | 4 | 12 | 8 | 10 |
| 6 | 3- | 2- | 1- | 2- | 2+ | 2- | 1+ | 3- | 14.7 | 21 | 11 | 4 | 13 | 18 | 11 | 9 | 23 | 14 | 12 |
| 7 | 2- | 1+ | 1+ | 2- | 2+ | 2+ | 2o | 3o | 15.7 | 13 | 8 | 9 | 11 | 19 | 20 | 14 | 30 | 16 | 17 |
| 8 | 2o | 3- | 3o | 2- | 2+ | 4o | 3+ | 2o | 21.0 | 15 | 25 | 29 | 12 | 20 | 51 | 36 | 16 | 26 | 22 |
| 9 | 2- | 2- | 1+ | 3o | 3- | 3- | 1o | 3o | 17.0 | 13 | 12 | 9 | 29 | 26 | 22 | 7 | 27 | 18 | 21 |
| 10 | 2+ | 2- | 1+ | 2+ | 2- | 2+ | 1+ | 1o | 14.0 | 18 | 13 | 10 | 20 | 12 | 18 | 9 | 7 | 13 | 14 |
| 11 | 2o | 1o | 1o | 0+ | 1o | 1+ | 3+ | 2o | 12.0 | 15 | 7 | 7 | 2 | 7 | 10 | 36 | 14 | 12 | 15 |
| 12 | 3o | 3- | 3- | 3- | 4+ | 4o | 2o | 2- | 23.0 | 33 | 21 | 25 | 22 | 62 | 52 | 16 | 12 | 30 | 21 |
| 13 | 2o | 1+ | 1o | 0o | 1o | 0+ | 1+ | 1+ | 8.3 | 14 | 10 | 7 | 0 | 7 | 3 | 9 | 8 | 7 | 15 |
| 14 | 1+ | 2- | 2- | 2o | 1+ | 2- | 1- | 1- | 11.0 | 10 | 11 | 12 | 14 | 8 | 11 | 4 | 4 | 9 | 8 |
| 15 | 0+ | 1o | 1- | 1+ | 3- | 1+ | 2- | 2o | 11.0 | 3 | 7 | 4 | 10 | 25 | 10 | 11 | 14 | 11 | 11 |
| 16 | 2- | 1+ | 2+ | 3o | 3+ | 3o | 3o | 2- | 19.3 | 13 | 9 | 17 | 29 | 35 | 33 | 31 | 12 | 22 | 17 |
| 17 | 1o | 2- | 1+ | 1+ | 2+ | 3- | 3- | 3- | 15.7 | 7 | 11 | 9 | 9 | 18 | 24 | 26 | 21 | 16 | 18 |
| 18 | 2- | 1+ | 1o | 2+ | 2- | 1o | 1+ | 2+ | 12.7 | 11 | 9 | 7 | 19 | 11 | 7 | 8 | 20 | 12 | 13 |
| 19 | 1+ | 1- | 1- | 1- | 1o | 1+ | 1+ | 2+ | 9.3 | 8 | 4 | 4 | 5 | 7 | 10 | 10 | 19 | 8 | 18 |
| 20 | 2o | 4- | 3+ | 5- | 4+ | 4+ | 4- | 3o | 29.0 | 16 | 47 | 36 | 73 | 63 | 63 | 41 | 29 | 46 | 33 |
| 21 | 3- | 2+ | 4- | 3o | 1+ | 4- | 3- | 3o | 22.3 | 21 | 18 | 42 | 28 | 9 | 43 | 21 | 31 | 27 | 34 |
| 22 | 2- | 3+ | 3+ | 4- | 2+ | 2- | 2o | 4- | 21.7 | 13 | 40 | 36 | 43 | 18 | 13 | 14 | 45 | 28 | 25 |
| 23 | 2+ | 2+ | 2o | 3- | 3+ | 3- | 3o | 2- | 20.0 | 18 | 17 | 14 | 23 | 38 | 21 | 28 | 13 | 22 | 20 |
| 24 | 2- | 1+ | 2- | 2+ | 2+ | 2+ | 4- | 3o | 18.3 | 12 | 9 | 11 | 18 | 19 | 19 | 45 | 31 | 21 | 20 |
| 25 | 2o | 1o | 1+ | 2+ | 1+ | 2- | 2+ | 1o | 13.0 | 16 | 6 | 9 | 19 | 9 | 11 | 18 | 7 | 12 | 15 |
| 26 | 1o | 0+ | 1o | 2+ | 2o | 1+ | 1o | 1o | 10.0 | 7 | 2 | 6 | 20 | 15 | 9 | 6 | 6 | 9 | 11 |
| 27 | 1- | 1+ | 3- | 2+ | 2+ | 3+ | 3+ | 3o | 19.0 | 5 | 9 | 25 | 19 | 17 | 34 | 40 | 29 | 22 | 19 |
| 28 | 2- | 2- | 2+ | 4- | 3- | 2- | 2+ | 3o | 19.0 | 12 | 13 | 17 | 44 | 23 | 13 | 19 | 33 | 22 | 22 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | | 16.7 | |

**MARCH 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 2+ | 1+ | 1+ | 1+ | 3- | 3o | 2+ | 16.3 | 15 | 17 | 9 | 9 | 10 | 25 | 33 | 17 | 17 | 15 |
| 2 | 0o | 0+ | 1o | 1- | 1+ | 1+ | 1- | 1+ | 6.7 | 1 | 2 | 7 | 4 | 8 | 9 | 5 | 8 | 6 | 11 |
| 3 | 0+ | 2- | 2- | 2- | 1o | 2- | 2+ | 2o | 12.3 | 3 | 13 | 11 | 12 | 7 | 13 | 19 | 16 | 12 | 12 |
| 4 | 3o | 1+ | 1+ | 3- | 3- | 2o | 2o | 2+ | 17.3 | 31 | 10 | 9 | 23 | 21 | 14 | 14 | 20 | 18 | 18 |
| 5 | 1+ | 3o | 2o | 4- | 4+ | 4o | 3o | 4o | 25.3 | 9 | 28 | 14 | 42 | 62 | 53 | 28 | 52 | 36 | 26 |
| 6 | 2+ | 2- | 2o | 2o | 1+ | 1- | 3- | 3o | 15.7 | 17 | 11 | 14 | 15 | 9 | 5 | 21 | 29 | 15 | 30 |
| 7 | 4- | 3o | 4- | 4- | 4o | 1+ | 2o | 1+ | 22.7 | 48 | 29 | 48 | 41 | 53 | 8 | 15 | 9 | 31 | 25 |
| 8 | 3- | 2- | 3o | 3- | 3- | 3o | 1+ | 2- | 18.7 | 21 | 13 | 29 | 24 | 25 | 29 | 10 | 12 | 20 | 20 |
| 9 | 3- | 3- | 2- | 1- | 1o | 1+ | 1o | 1- | 11.7 | 23 | 26 | 13 | 5 | 6 | 9 | 7 | 5 | 12 | 14 |
| 10 | 1o | 2- | 3- | 2o | 4- | 3o | 1o | 0o | 15.0 | 6 | 13 | 24 | 16 | 49 | 31 | 7 | 1 | 18 | 14 |
| 11 | 1+ | 1+ | 2- | 2o | 3- | 3o | 3o | 1+ | 16.3 | 8 | 8 | 13 | 15 | 25 | 29 | 27 | 9 | 17 | 19 |
| 12 | 2+ | 2+ | 2o | 3o | 2- | 1+ | 3- | 4- | 19.0 | 17 | 18 | 15 | 31 | 12 | 8 | 21 | 49 | 21 | 20 |
| 13 | 3- | 2- | 2o | 2o | 2- | 1+ | 1o | 2o | 14.3 | 22 | 11 | 14 | 14 | 13 | 8 | 7 | 16 | 13 | 16 |
| 14 | 2- | 2+ | 2- | 2o | 2- | 2- | 2o | 1+ | 14.3 | 13 | 19 | 11 | 16 | 12 | 11 | 16 | 10 | 14 | 14 |
| 15 | 2- | 3- | 2o | 2+ | 2+ | 1+ | 1+ | 2+ | 16.0 | 11 | 24 | 14 | 19 | 17 | 9 | 10 | 17 | 15 | 15 |
| 16 | 2+ | 1o | 3- | 3- | 3+ | 1+ | 2+ | 2+ | 18.0 | 20 | 6 | 21 | 24 | 37 | 9 | 19 | 18 | 19 | 18 |
| 17 | 3- | 3o | 2+ | 1+ | 2o | 2- | 1o | 1o | 15.0 | 22 | 31 | 17 | 10 | 14 | 11 | 6 | 6 | 15 | 15 |
| 18 | 2o | 1+ | 2- | 1o | 2+ | 3o | 3- | 4- | 17.7 | 15 | 8 | 13 | 7 | 19 | 32 | 26 | 50 | 21 | 19 |
| 19 | 3+ | 3- | 2o | 3- | 2+ | 1+ | 2o | 2+ | 18.7 | 35 | 24 | 16 | 22 | 17 | 8 | 15 | 18 | 19 | 19 |
| 20 | 1- | 0o | 1- | 1- | 1+ | 1+ | 1o | 1+ | 7.0 | 5 | 1 | 4 | 4 | 8 | 8 | 6 | 9 | 6 | 10 |
| 21 | 1o | 1+ | 2- | 3- | 3+ | 4o | 3+ | 4o | 21.3 | 7 | 8 | 12 | 24 | 40 | 54 | 38 | 52 | 29 | 23 |
| 22 | 4o | 2- | 2- | 2+ | 1+ | 2o | 4- | 3+ | 20.0 | 55 | 13 | 13 | 17 | 9 | 16 | 44 | 40 | 26 | 28 |
| 23 | 1+ | 1+ | 2o | 2+ | 2o | 1+ | 1- | 0+ | 11.3 | 10 | 8 | 14 | 19 | 15 | 8 | 5 | 2 | 10 | 14 |
| 24 | 1o | 0o | 3- | 1o | 0+ | 1- | 1+ | 1+ | 8.3 | 6 | 1 | 21 | 6 | 3 | 4 | 10 | 8 | 7 | 6 |
| 25 | 1- | 0o | 0+ | 0+ | 1o | 3o | 2- | 2+ | 9.3 | 4 | 1 | 3 | 3 | 6 | 33 | 11 | 19 | 10 | 13 |
| 26 | 2+ | 2o | 3o | 3o | 2+ | 3- | 2+ | 1o | 18.7 | 20 | 16 | 27 | 32 | 20 | 26 | 17 | 7 | 21 | 23 |
| 27 | 3- | 3- | 3- | 4o | 4o | 4- | 3- | 3- | 25.0 | 21 | 24 | 26 | 58 | 54 | 50 | 24 | 25 | 35 | 30 |
| 28 | 4o | 3- | 3o | 2o | 2o | 1+ | 1+ | 1- | 17.0 | 51 | 26 | 27 | 16 | 15 | 9 | 9 | 5 | 20 | 22 |
| 29 | 1- | 1o | 3- | 2- | 0+ | 1- | 1+ | 1o | 9.3 | 4 | 7 | 21 | 13 | 3 | 5 | 8 | 6 | 8 | 8 |
| 30 | 1- | 1- | 0+ | 1o | 2- | 1+ | 1+ | 0+ | 7.3 | 4 | 5 | 3 | 6 | 12 | 9 | 8 | 2 | 6 | 6 |
| 31 | 1o | 1+ | 1o | 1o | 1+ | 1- | 1o | 1- | 8.0 | 6 | 10 | 7 | 7 | 10 | 5 | 7 | 5 | 7 | 12 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | 16.9 | |

**APRIL 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2+ | 3o | 3o | 2+ | 2- | 2- | 2o | 1- | 16.7 | 20 | 29 | 28 | 19 | 12 | 12 | 14 | 4 | 17 | 13 |
| 2 | 1- | 1+ | 1+ | 2- | 1o | 2- | 1- | 0+ | 8.7 | 5 | 10 | 8 | 12 | 7 | 11 | 4 | 2 | 7 | 7 |
| 3 | 0o | 0+ | 0+ | 0+ | 0+ | 0+ | 0+ | 0+ | 2.3 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 9 |
| 4 | 0+ | 4- | 2+ | 4- | 4o | 3o | 1+ | 1+ | 19.7 | 2 | 41 | 20 | 46 | 60 | 32 | 8 | 10 | 27 | 19 |
| 5 | 3- | 3o | 2o | 1+ | 3- | 3- | 3- | 2+ | 19.3 | 24 | 33 | 15 | 8 | 21 | 25 | 23 | 19 | 21 | 20 |
| 6 | 1+ | 2o | 0+ | 2- | 2+ | 2- | 1o | 1+ | 11.7 | 8 | 15 | 3 | 12 | 17 | 12 | 6 | 9 | 10 | 18 |
| 7 | 3o | 3+ | 3+ | 2o | 2+ | 3o | 2- | 1- | 19.3 | 27 | 34 | 36 | 16 | 18 | 31 | 13 | 4 | 22 | 18 |
| 8 | 1o | 1+ | 3- | 3- | 2- | 2- | 3+ | 3- | 17.0 | 6 | 9 | 22 | 21 | 12 | 13 | 37 | 21 | 18 | 16 |
| 9 | 1+ | 1+ | 1+ | 2o | 2+ | 2- | 3+ | 2- | 15.0 | 9 | 9 | 8 | 16 | 18 | 13 | 34 | 13 | 15 | 19 |
| 10 | 4- | 3+ | 2o | 1+ | 0+ | 1- | 1- | 0o | 12.0 | 46 | 34 | 15 | 10 | 3 | 4 | 5 | 1 | 15 | 16 |
| 11 | 1- | 2+ | 2+ | 2- | 3- | 1+ | 1- | 2- | 13.3 | 5 | 17 | 17 | 13 | 21 | 10 | 5 | 11 | 12 | 9 |
| 12 | 1o | 2- | 1- | 1o | 1+ | 1- | 0+ | 2- | 8.3 | 7 | 13 | 4 | 6 | 9 | 4 | 3 | 11 | 7 | 10 |
| 13 | 2- | 1+ | 2o | 2+ | 1- | 4- | 3o | 3- | 17.3 | 12 | 8 | 14 | 20 | 4 | 48 | 30 | 25 | 20 | 13 |
| 14 | 0+ | 1- | 1o | 2- | 3o | 2o | 2o | 1o | 11.7 | 3 | 4 | 7 | 12 | 31 | 14 | 15 | 6 | 12 | 14 |
| 15 | 2- | 1- | 1- | 1o | 2- | 2o | 2o | 1+ | 11.0 | 13 | 5 | 5 | 6 | 12 | 14 | 15 | 9 | 10 | 11 |
| 16 | 1- | 1+ | 1+ | 1o | 1- | 1- | 0o | 1o | 6.7 | 4 | 8 | 9 | 7 | 5 | 5 | 1 | 7 | 6 | 8 |
| 17 | 2- | 1- | 0+ | 0+ | 1+ | 1+ | 1o | 1- | 7.3 | 13 | 5 | 3 | 3 | 8 | 9 | 7 | 5 | 7 | 6 |
| 18 | 0+ | 1- | 1- | 1+ | 1o | 1- | 1+ | 1o | 7.0 | 3 | 5 | 5 | 9 | 6 | 5 | 8 | 6 | 6 | 11 |
| 19 | 1+ | 3- | 3+ | 3+ | 1+ | 1o | 2- | 1+ | 16.0 | 8 | 21 | 35 | 34 | 9 | 7 | 11 | 8 | 17 | 18 |
| 20 | 1o | 3+ | 3+ | 4- | 2o | 1o | 0+ | 0+ | 15.0 | 6 | 38 | 39 | 47 | 15 | 7 | 2 | 3 | 20 | 14 |
| 21 | 0+ | 1+ | 2- | 1o | 0+ | 0+ | 0o | 0o | 5.0 | 3 | 10 | 13 | 6 | 2 | 2 | 1 | 1 | 5 | 6 |
| 22 | 0+ | 1+ | 1o | 1o | 1+ | 1o | 2- | 2- | 9.3 | 2 | 10 | 6 | 7 | 8 | 7 | 11 | 13 | 8 | 6 |
| 23 | 1- | 2- | 0+ | 1- | 1- | 1- | 1- | 1+ | 6.7 | 5 | 12 | 3 | 4 | 5 | 4 | 4 | 8 | 6 | 10 |
| 24 | 2o | 2+ | 2o | 3o | 3o | 1o | 2+ | 2- | 17.3 | 14 | 18 | 16 | 30 | 33 | 6 | 19 | 11 | 18 | 12 |
| 25 | 1- | 1o | 1+ | 1o | 1- | 1+ | 1+ | 1o | 8.3 | 4 | 6 | 9 | 7 | 5 | 9 | 8 | 6 | 7 | 9 |
| 26 | 1+ | 1o | 0+ | 1o | 2- | 1o | 1o | 0+ | 7.7 | 8 | 7 | 2 | 6 | 12 | 6 | 7 | 3 | 6 | 9 |
| 27 | 1o | 2- | 3- | 3o | 2- | 3o | 2- | 2o | 16.7 | 6 | 11 | 22 | 32 | 13 | 28 | 13 | 14 | 17 | 11 |
| 28 | 1o | 0+ | 0o | 0+ | 0+ | 0o | 0+ | 1o | 3.3 | 7 | 2 | 1 | 2 | 3 | 1 | 2 | 6 | 3 | 7 |
| 29 | 1o | 1o | 1- | 1o | 0+ | 1- | 2+ | 1- | 7.7 | 6 | 6 | 4 | 7 | 2 | 5 | 17 | 5 | 7 | 5 |
| 30 | 0+ | 1o | 1- | 1- | 1o | 1+ | 1+ | 2- | 8.0 | 2 | 7 | 5 | 4 | 6 | 8 | 10 | 11 | 7 | 8 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | 11.8 | |

**MAY 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1- | 0+ | 2- | 3- | 2o | 2- | 2o | 2+ | 13.3 | 5 | 2 | 12 | 23 | 14 | 13 | 15 | 20 | 13 | 11 |
| 2 | 2- | 1- | 2- | 2o | 1o | 1+ | 1+ | 2- | 11.3 | 11 | 4 | 13 | 15 | 7 | 8 | 9 | 11 | 10 | 12 |
| 3 | 1- | 1o | 2+ | 3- | 2o | 1+ | 1+ | 0+ | 11.7 | 4 | 6 | 19 | 21 | 16 | 8 | 9 | 3 | 11 | 10 |
| 4 | 1- | 2- | 2+ | 1+ | 1+ | 1o | 1- | 1o | 10.0 | 4 | 11 | 20 | 9 | 9 | 7 | 5 | 6 | 9 | 8 |
| 5 | 1- | 0+ | 0+ | 1+ | 1+ | 1+ | 2- | 1- | 7.7 | 4 | 2 | 3 | 10 | 10 | 9 | 12 | 5 | 7 | 5 |
| 6 | 0+ | 0+ | 0o | 0o | 1+ | 2- | 2o | 3- | 8.3 | 2 | 2 | 0 | 1 | 9 | 12 | 16 | 23 | 8 | 12 |
| 7 | 3- | 3o | 2+ | 2+ | 2- | 1+ | 1o | 1+ | 15.7 | 23 | 30 | 17 | 19 | 12 | 10 | 6 | 10 | 16 | 14 |
| 8 | 1o | 2- | 1- | 1o | 1- | 1+ | 0+ | 1+ | 8.0 | 7 | 13 | 4 | 7 | 5 | 9 | 3 | 9 | 7 | 8 |
| 9 | 1o | 2- | 2- | 2- | 1o | 1- | 1- | 1- | 9.0 | 6 | 11 | 11 | 12 | 7 | 5 | 4 | 5 | 8 | 10 |
| 10 | 1o | 1+ | 2+ | 3o | 4- | 2o | 2- | 1o | 16.0 | 7 | 9 | 19 | 30 | 43 | 14 | 12 | 7 | 18 | 12 |
| 11 | 1+ | 1o | 1- | 1- | 0+ | 1o | 3- | 3- | 10.3 | 9 | 6 | 5 | 5 | 3 | 6 | 22 | 22 | 10 | 10 |
| 12 | 1- | 0+ | 0o | 0o | 0+ | 0+ | 0+ | 1+ | 3.3 | 4 | 3 | 0 | 1 | 3 | 3 | 3 | 8 | 3 | 7 |
| 13 | 0+ | 1o | 2o | 1o | 2- | 2- | 2- | 3- | 12.0 | 3 | 6 | 15 | 7 | 13 | 13 | 13 | 25 | 12 | 11 |
| 14 | 3- | 1+ | 2- | 2+ | 3- | 2o | 1+ | 2o | 16.0 | 22 | 8 | 12 | 18 | 26 | 15 | 10 | 14 | 16 | 13 |
| 15 | 0+ | 1o | 1+ | 1+ | 1+ | 1+ | 1- | 1- | 8.0 | 2 | 6 | 9 | 9 | 9 | 8 | 4 | 4 | 6 | 9 |
| 16 | 1o | 2- | 1o | 1o | 1- | 1o | 1+ | 1o | 8.7 | 6 | 11 | 6 | 6 | 5 | 7 | 10 | 6 | 7 | 6 |
| 17 | 1o | 0+ | 0o | 1- | 1- | 1o | 1o | 1+ | 6.0 | 6 | 3 | 0 | 4 | 5 | 6 | 6 | 9 | 5 | 5 |
| 18 | 1- | 0+ | 1- | 0+ | 0+ | 0+ | 1- | 0+ | 3.7 | 5 | 2 | 4 | 2 | 3 | 2 | 4 | 2 | 3 | 4 |
| 19 | 0+ | 0+ | 0+ | 0+ | 0+ | 1- | 0+ | 1- | 3.3 | 3 | 3 | 2 | 2 | 3 | 4 | 2 | 5 | 3 | 4 |
| 20 | 2- | 1- | 1o | 1- | 1- | 1o | 1- | 1+ | 7.7 | 11 | 4 | 7 | 4 | 5 | 7 | 4 | 8 | 6 | 5 |
| 21 | 1o | 0+ | 0o | 0+ | 0+ | 1- | 1- | 0+ | 3.7 | 7 | 3 | 1 | 2 | 2 | 4 | 4 | 2 | 3 | 5 |
| 22 | 1- | 1+ | 1o | 1+ | 2- | 3- | 2o | 2o | 12.7 | 5 | 8 | 7 | 10 | 13 | 21 | 15 | 15 | 12 | 10 |
| 23 | 2- | 2- | 2- | 2- | 2- | 2o | 2+ | 3o | 15.7 | 12 | 11 | 11 | 13 | 11 | 14 | 17 | 29 | 15 | 18 |
| 24 | 2- | 3+ | 2+ | 3+ | 2+ | 4- | 3+ | 4+ | 24.3 | 11 | 35 | 19 | 39 | 18 | 48 | 37 | 61 | 34 | 34 |
| 25 | 3o | 5- | 4+ | 3+ | 3+ | 2+ | 3- | 1o | 24.7 | 27 | 82 | 62 | 40 | 40 | 17 | 24 | 7 | 37 | 32 |
| 26 | 0+ | 1+ | 2+ | 2+ | 2o | 3- | 4- | 2+ | 17.0 | 3 | 10 | 18 | 17 | 16 | 23 | 44 | 19 | 19 | 23 |
| 27 | 3- | 3o | 3+ | 4- | 3- | 2o | 3- | 3- | 22.7 | 22 | 30 | 36 | 43 | 22 | 14 | 24 | 23 | 27 | 23 |
| 28 | 2o | 2- | 2- | 2+ | 2- | 1o | 2+ | 4o | 16.7 | 14 | 11 | 11 | 20 | 13 | 6 | 19 | 51 | 18 | 29 |
| 29 | 3+ | 4+ | 4+ | 4+ | 4- | 2o | 1o | 0+ | 23.3 | 38 | 68 | 65 | 64 | 43 | 14 | 7 | 3 | 38 | 27 |
| 30 | 0+ | 0+ | 2- | 3- | 3o | 2o | 3o | 2o | 15.0 | 2 | 3 | 13 | 26 | 33 | 15 | 28 | 15 | 17 | 17 |
| 31 | 1+ | 2- | 3- | 3o | 2+ | 2+ | 4- | 3- | 19.7 | 10 | 13 | 21 | 29 | 19 | 19 | 42 | 21 | 22 | 20 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | | 13.5 | |

**JUNE 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3- | 2- | 1o | 2- | 2o | 1+ | 2o | 2+ | 14.7 | 24 | 11 | 7 | 12 | 15 | 10 | 16 | 17 | 14 | 18 |
| 2 | 3o | 3- | 2o | 2- | 1- | 1o | 1- | 1o | 12.7 | 28 | 22 | 15 | 13 | 5 | 7 | 5 | 6 | 13 | 11 |
| 3 | 0+ | 1o | 1- | 1+ | 1o | 1- | 2o | 2- | 8.7 | 2 | 7 | 4 | 9 | 7 | 5 | 14 | 13 | 8 | 8 |
| 4 | 2o | 1+ | 1+ | 2+ | 2o | 1+ | 1+ | 1+ | 13.0 | 14 | 9 | 10 | 17 | 14 | 10 | 10 | 10 | 12 | 11 |
| 5 | 1o | 2- | 1+ | 1+ | 2+ | 3- | 2- | 2o | 14.0 | 7 | 11 | 9 | 8 | 17 | 22 | 13 | 15 | 13 | 17 |
| 6 | 1o | 2- | 4o | 4o | 5- | 3o | 3+ | 3+ | 25.0 | 6 | 13 | 53 | 59 | 76 | 28 | 36 | 40 | 39 | 28 |
| 7 | 3o | 1o | 1+ | 3- | 2+ | 2o | 2+ | 2+ | 17.0 | 32 | 6 | 9 | 26 | 20 | 16 | 18 | 20 | 18 | 23 |
| 8 | 1+ | 1o | 1+ | 1+ | 1+ | 1- | 1- | 1o | 8.7 | 9 | 6 | 10 | 9 | 8 | 4 | 4 | 7 | 7 | 9 |
| 9 | 1- | 1- | 1- | 1- | 1- | 1o | 1o | 1+ | 6.7 | 5 | 5 | 4 | 5 | 4 | 6 | 6 | 10 | 6 | 6 |
| 10 | 2o | 1o | 1- | 1+ | 1+ | 1o | 1o | 1o | 9.3 | 15 | 6 | 4 | 8 | 10 | 7 | 7 | 7 | 8 | 9 |
| 11 | 1+ | 1+ | 2- | 3- | 2o | 1+ | 2- | 2- | 13.7 | 9 | 9 | 12 | 23 | 14 | 10 | 12 | 11 | 13 | 13 |
| 12 | 2- | 3- | 2+ | 3- | 2+ | 3- | 2+ | 2o | 18.7 | 11 | 22 | 17 | 22 | 19 | 22 | 19 | 16 | 19 | 16 |
| 13 | 2o | 2+ | 2- | 2- | 2o | 1o | 1+ | 1+ | 13.3 | 15 | 17 | 12 | 11 | 15 | 7 | 9 | 9 | 12 | 14 |
| 14 | 1+ | 1+ | 3- | 2o | 1o | 1- | 1- | 2- | 11.3 | 10 | 10 | 24 | 14 | 7 | 4 | 4 | 12 | 11 | 9 |
| 15 | 1- | 1- | 1o | 1+ | 1+ | 2o | 2- | 2- | 10.3 | 5 | 4 | 7 | 9 | 8 | 16 | 13 | 12 | 9 | 9 |
| 16 | 2- | 1+ | 2+ | 1+ | 1+ | 2o | 3- | 2+ | 15.0 | 13 | 8 | 19 | 9 | 8 | 14 | 22 | 18 | 14 | 13 |
| 17 | 3- | 2- | 1- | 1+ | 2o | 1- | 1o | 2- | 11.7 | 24 | 12 | 5 | 9 | 16 | 4 | 6 | 13 | 11 | 13 |
| 18 | 2- | 2- | 2- | 2- | 1+ | 2- | 1+ | 2- | 12.7 | 13 | 12 | 13 | 12 | 8 | 11 | 10 | 11 | 11 | 17 |
| 19 | 3- | 3- | 4o | 4- | 3+ | 1+ | 2- | 4- | 23.0 | 25 | 21 | 54 | 50 | 34 | 10 | 12 | 41 | 31 | 21 |
| 20 | 2- | 1+ | 1+ | 2- | 2+ | 2+ | 3- | 4- | 17.0 | 13 | 10 | 8 | 11 | 19 | 17 | 25 | 41 | 18 | 18 |
| 21 | 3- | 1+ | 1- | 1- | 1- | 1+ | 2- | 2o | 11.0 | 22 | 10 | 5 | 5 | 4 | 9 | 12 | 15 | 10 | 13 |
| 22 | 1o | 1- | 1+ | 1+ | 1o | 1- | 2- | 1o | 8.7 | 7 | 4 | 9 | 8 | 6 | 4 | 12 | 7 | 7 | 7 |
| 23 | 1- | 1+ | 0+ | 0+ | 0+ | 1- | 1+ | 1- | 5.7 | 5 | 10 | 3 | 2 | 3 | 5 | 8 | 5 | 5 | 7 |
| 24 | 1- | 1o | 2o | 1o | 1- | 2o | 2+ | 3- | 12.3 | 4 | 7 | 16 | 7 | 4 | 15 | 18 | 22 | 12 | 9 |
| 25 | 1- | 1o | 1+ | 2- | 1+ | 1+ | 3- | 3+ | 13.3 | 5 | 7 | 8 | 12 | 9 | 10 | 21 | 40 | 14 | 15 |
| 26 | 3+ | 2+ | 1o | 0+ | 1+ | 1+ | 2o | 2+ | 14.0 | 35 | 17 | 7 | 3 | 8 | 10 | 14 | 17 | 14 | 15 |
| 27 | 1+ | 1+ | 2- | 2o | 1+ | 1o | 1- | 0+ | 9.7 | 10 | 10 | 12 | 16 | 10 | 7 | 4 | 3 | 9 | 10 |
| 28 | 1- | 2- | 1+ | 1+ | 1+ | 1o | 1+ | 2o | 10.7 | 4 | 11 | 10 | 10 | 8 | 7 | 8 | 14 | 9 | 10 |
| 29 | 2o | 2o | 2o | 2+ | 1o | 1+ | 1+ | 2- | 13.7 | 16 | 16 | 14 | 18 | 7 | 10 | 9 | 12 | 13 | 10 |
| 30 | 1+ | 1+ | 1- | 1- | 1- | 0+ | 1- | 1- | 6.3 | 9 | 8 | 5 | 5 | 4 | 3 | 4 | 4 | 5 | 6 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | | 12.8 | |

**JULY 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0+ | 1- | 0o | 0+ | 1- | 1- | 1- | 1- | 4.0 | 2 | 4 | 1 | 2 | 4 | 5 | 5 | 4 | 3 | 4 |
| 2 | 1- | 1o | 1- | 0+ | 1- | 1- | 2- | 1+ | 7.0 | 5 | 6 | 5 | 3 | 4 | 4 | 11 | 8 | 6 | 6 |
| 3 | 1- | 1+ | 1+ | 2- | 1o | 1o | 3+ | 3o | 13.3 | 5 | 9 | 8 | 11 | 7 | 6 | 37 | 29 | 14 | 13 |
| 4 | 3- | 3- | 2o | 0+ | 1- | 1+ | 2+ | 1+ | 13.3 | 24 | 21 | 15 | 3 | 4 | 10 | 19 | 10 | 13 | 15 |
| 5 | 2- | 2- | 2o | 2- | 1+ | 1+ | 2- | 2- | 13.0 | 13 | 12 | 16 | 11 | 9 | 10 | 12 | 13 | 12 | 11 |
| 6 | 1+ | 2- | 1+ | 1o | 1+ | 1+ | 2- | 2o | 11.7 | 9 | 11 | 9 | 7 | 10 | 8 | 13 | 15 | 10 | 9 |
| 7 | 1- | 0+ | 1- | 1o | 1o | 1+ | 2- | 1o | 7.7 | 5 | 3 | 4 | 6 | 6 | 8 | 12 | 6 | 6 | 11 |
| 8 | 2- | 2+ | 2+ | 3- | 2+ | 2- | 2- | 2o | 16.7 | 12 | 19 | 20 | 23 | 18 | 12 | 12 | 15 | 16 | 14 |
| 9 | 2- | 2+ | 2+ | 2+ | 2- | 2+ | 2o | 3- | 17.3 | 11 | 20 | 19 | 17 | 11 | 18 | 14 | 22 | 17 | 18 |
| 10 | 3+ | 3- | 3- | 3- | 3o | 2o | 2- | 1+ | 19.3 | 34 | 21 | 21 | 26 | 28 | 14 | 13 | 8 | 21 | 18 |
| 11 | 1+ | 2o | 3- | 1+ | 1+ | 1+ | 2- | 2o | 13.7 | 10 | 15 | 21 | 8 | 9 | 10 | 12 | 14 | 12 | 14 |
| 12 | 1o | 2- | 2o | 3o | 2o | 2- | 2- | 2o | 15.0 | 7 | 11 | 15 | 27 | 14 | 11 | 11 | 14 | 14 | 11 |
| 13 | 1+ | 1- | 1o | 1- | 1- | 1- | 1o | 2- | 7.7 | 9 | 5 | 6 | 5 | 5 | 4 | 6 | 13 | 7 | 9 |
| 14 | 2- | 2o | 2- | 1+ | 0+ | 1+ | 1+ | 2- | 11.3 | 12 | 14 | 13 | 9 | 3 | 8 | 10 | 11 | 10 | 14 |
| 15 | 1+ | 2- | 4o | 3o | 4o | 4- | 3+ | 4o | 25.0 | 10 | 11 | 54 | 33 | 53 | 44 | 40 | 55 | 38 | 32 |
| 16 | 4o | 3+ | 3+ | 3+ | 2o | 3+ | 3o | 4- | 26.0 | 60 | 36 | 36 | 40 | 15 | 38 | 27 | 43 | 37 | 38 |
| 17 | 3- | 3+ | 3- | 3o | 3+ | 2- | 3- | 3- | 22.0 | 26 | 39 | 24 | 30 | 34 | 12 | 24 | 22 | 26 | 26 |
| 18 | 3- | 3- | 2o | 2+ | 2+ | 2+ | 3- | 2+ | 19.3 | 26 | 24 | 16 | 19 | 20 | 18 | 26 | 18 | 21 | 19 |
| 19 | 2+ | 1+ | 1- | 2+ | 3- | 2o | 2+ | 2+ | 16.0 | 18 | 10 | 5 | 18 | 21 | 15 | 20 | 19 | 16 | 16 |
| 20 | 2- | 2+ | 1+ | 1o | 2- | 2o | 2o | 3o | 15.0 | 11 | 19 | 9 | 7 | 13 | 16 | 15 | 30 | 15 | 15 |
| 21 | 1+ | 1+ | 2+ | 1+ | 1+ | 1+ | 1+ | 1+ | 11.7 | 10 | 9 | 17 | 9 | 8 | 9 | 8 | 10 | 10 | 14 |
| 22 | 2- | 2- | 3- | 2o | 1o | 1o | 2+ | 2- | 14.0 | 13 | 13 | 23 | 14 | 7 | 7 | 17 | 13 | 13 | 10 |
| 23 | 1o | 1o | 1- | 0+ | 1+ | 1+ | 2- | 2+ | 9.7 | 6 | 7 | 5 | 3 | 10 | 8 | 13 | 19 | 9 | 9 |
| 24 | 1o | 1+ | 1- | 1- | 1- | 3o | 3+ | 3- | 13.3 | 7 | 10 | 4 | 4 | 5 | 31 | 37 | 24 | 15 | 19 |
| 25 | 3- | 3- | 3+ | 4o | 3o | 3- | 3- | 2+ | 23.3 | 24 | 22 | 35 | 54 | 27 | 23 | 22 | 17 | 28 | 22 |
| 26 | 1- | 1- | 1+ | 1o | 0+ | 1- | 1- | 1- | 6.0 | 5 | 4 | 8 | 6 | 3 | 5 | 4 | 4 | 5 | 10 |
| 27 | 2- | 1+ | 1+ | 1- | 1+ | 1o | 1+ | 1- | 9.3 | 13 | 8 | 9 | 5 | 10 | 6 | 8 | 4 | 8 | 10 |
| 28 | 1+ | 1o | 3- | 4- | 4o | 4- | 3+ | 4+ | 24.0 | 8 | 7 | 23 | 41 | 53 | 45 | 36 | 67 | 35 | 44 |
| 29 | 5o | 5+ | 5- | 5o | 4o | 3- | 1+ | 1+ | 29.3 | 102 | 119 | 81 | 87 | 54 | 21 | 8 | 8 | 60 | 46 |
| 30 | 3o | 1o | 1+ | 1+ | 3- | 1+ | 2+ | 3o | 16.0 | 27 | 7 | 10 | 9 | 22 | 10 | 17 | 31 | 17 | 22 |
| 31 | 3o | 4+ | 3- | 2o | 2- | 2- | 2o | 2- | 19.0 | 32 | 65 | 24 | 14 | 12 | 11 | 14 | 12 | 23 | 23 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | 17.3 | |

**AUGUST 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3o | 3+ | 2- | 2o | 2- | 2- | 1+ | 1o | 15.7 | 28 | 39 | 13 | 16 | 11 | 13 | 9 | 7 | 17 | 14 |
| 2 | 2+ | 1+ | 1+ | 1- | 1+ | 1o | 1o | 1o | 10.0 | 18 | 9 | 10 | 5 | 8 | 7 | 6 | 6 | 9 | 10 |
| 3 | 1o | 2- | 2- | 3- | 3- | 4o | 3- | 1+ | 17.7 | 6 | 12 | 13 | 21 | 25 | 52 | 24 | 8 | 20 | 14 |
| 4 | 1o | 2- | 1+ | 1o | 1o | 2o | 2o | 3- | 12.7 | 7 | 13 | 8 | 7 | 7 | 16 | 16 | 21 | 12 | 21 |
| 5 | 3o | 3o | 3+ | 3- | 3- | 2o | 2o | 2- | 20.3 | 33 | 33 | 38 | 26 | 26 | 15 | 16 | 11 | 25 | 20 |
| 6 | 1o | 2o | 2o | 3- | 2+ | 3- | 2o | 1+ | 16.0 | 7 | 15 | 15 | 24 | 18 | 21 | 16 | 9 | 16 | 14 |
| 7 | 2o | 1o | 1- | 1- | 1+ | 1o | 0+ | 1o | 8.0 | 15 | 6 | 4 | 5 | 9 | 6 | 3 | 6 | 7 | 10 |
| 8 | 1+ | 1+ | 2- | 2o | 3- | 2o | 2+ | 4- | 17.0 | 8 | 9 | 13 | 15 | 21 | 14 | 17 | 50 | 18 | 16 |
| 9 | 3+ | 3- | 2+ | 2- | 3- | 1+ | 2- | 1o | 16.7 | 36 | 23 | 20 | 13 | 26 | 10 | 11 | 7 | 18 | 17 |
| 10 | 1- | 1- | 1o | 1o | 1o | 1+ | 2- | 1+ | 8.7 | 4 | 4 | 6 | 7 | 6 | 10 | 11 | 9 | 7 | 8 |
| 11 | 2- | 1o | 0+ | 1- | 1+ | 2o | 3- | 2o | 11.7 | 11 | 7 | 2 | 4 | 8 | 15 | 21 | 16 | 11 | 13 |
| 12 | 3- | 2+ | 2+ | 2o | 3+ | 3+ | 3o | 4- | 22.7 | 26 | 20 | 18 | 16 | 36 | 37 | 28 | 49 | 29 | 32 |
| 13 | 3o | 3o | 5o | 4o | 2+ | 2o | 3- | 3o | 25.0 | 32 | 33 | 98 | 51 | 19 | 14 | 24 | 32 | 38 | 37 |
| 14 | 3+ | 4+ | 2+ | 3- | 3- | 3- | 3o | 3+ | 24.3 | 38 | 62 | 20 | 21 | 25 | 26 | 32 | 34 | 32 | 30 |
| 15 | 2+ | 3+ | 3+ | 3+ | 3o | 3- | 3+ | 4o | 25.3 | 19 | 37 | 37 | 40 | 29 | 21 | 36 | 51 | 34 | 32 |
| 16 | 3+ | 3o | 3- | 3o | 2o | 2- | 2+ | 2o | 20.0 | 35 | 31 | 26 | 27 | 16 | 12 | 18 | 15 | 23 | 24 |
| 17 | 2+ | 2o | 2- | 2o | 3o | 3+ | 2o | 2o | 18.3 | 19 | 15 | 12 | 15 | 31 | 38 | 16 | 15 | 20 | 17 |
| 18 | 1+ | 3- | 2- | 1+ | 1o | 2- | 1+ | 2- | 12.7 | 10 | 23 | 12 | 9 | 6 | 11 | 10 | 11 | 12 | 16 |
| 19 | 2- | 2+ | 2+ | 1+ | 3- | 2o | 2- | 2+ | 16.3 | 11 | 18 | 18 | 10 | 22 | 14 | 11 | 17 | 15 | 14 |
| 20 | 2o | 2+ | 2o | 3- | 2+ | 2- | 2o | 1+ | 16.3 | 14 | 18 | 14 | 22 | 17 | 13 | 15 | 10 | 15 | 15 |
| 21 | 2+ | 1+ | 2- | 1- | 1- | 2- | 2- | 0+ | 10.3 | 18 | 10 | 12 | 5 | 5 | 11 | 12 | 2 | 9 | 11 |
| 22 | 1o | 1+ | 1+ | 3- | 1+ | 2o | 2+ | 2- | 13.7 | 7 | 8 | 8 | 24 | 10 | 14 | 20 | 12 | 13 | 12 |
| 23 | 2- | 2o | 2+ | 2+ | 2+ | 3o | 2+ | 2+ | 18.3 | 11 | 16 | 17 | 19 | 20 | 28 | 20 | 20 | 19 | 17 |
| 24 | 2o | 2- | 1o | 4- | 3+ | 3- | 3o | 2o | 19.3 | 14 | 11 | 6 | 41 | 39 | 24 | 28 | 16 | 22 | 27 |
| 25 | 2+ | 2- | 4- | 5o | 5+ | 5- | 4+ | 4+ | 31.3 | 20 | 11 | 42 | 95 | 116 | 75 | 68 | 66 | 62 | 58 |
| 26 | 5o | 5o | 4+ | 4+ | 5- | 3+ | 4- | 3o | 33.3 | 95 | 102 | 65 | 63 | 72 | 39 | 47 | 30 | 64 | 61 |
| 27 | 3o | 3- | 3+ | 3+ | 4- | 5- | 4- | 2- | 26.0 | 28 | 26 | 38 | 39 | 42 | 73 | 41 | 11 | 37 | 34 |
| 28 | 2- | 2o | 1o | 2+ | 2+ | 3- | 3+ | 4+ | 19.7 | 13 | 14 | 7 | 17 | 18 | 26 | 38 | 64 | 25 | 28 |
| 29 | 3+ | 1+ | 1+ | 3- | 1+ | 3o | 3o | 3- | 18.7 | 35 | 8 | 10 | 23 | 8 | 30 | 33 | 26 | 22 | 29 |
| 30 | 2+ | 3o | 5- | 3o | 2o | 3o | 3o | 3- | 23.7 | 20 | 31 | 72 | 27 | 14 | 29 | 27 | 25 | 31 | 33 |
| 31 | 3o | 3+ | 5o | 3- | 5- | 5- | 3o | 3- | 29.0 | 30 | 36 | 93 | 26 | 72 | 81 | 31 | 24 | 49 | 43 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | 23.6 | |

**SEPTEMBER 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4- | 4o | 4- | 4- | 4+ | 4o | 3+ | 4o | 30.7 | 46 | 56 | 48 | 50 | 70 | 55 | 37 | 51 | 52 | 46 |
| 2 | 3+ | 3o | 3o | 2+ | 2+ | 2+ | 2+ | 1+ | 20.0 | 35 | 33 | 28 | 17 | 18 | 18 | 20 | 8 | 22 | 27 |
| 3 | 0+ | 1+ | 2+ | 1o | 1o | 1- | 0+ | 0+ | 7.3 | 3 | 8 | 17 | 7 | 6 | 4 | 2 | 2 | 6 | 10 |
| 4 | 2- | 2+ | 0+ | 1+ | 2- | 2+ | 2+ | 2+ | 14.3 | 11 | 17 | 2 | 10 | 13 | 20 | 17 | 19 | 14 | 12 |
| 5 | 2o | 1+ | 2o | 2+ | 2- | 1o | 1+ | 2- | 13.3 | 15 | 10 | 16 | 20 | 12 | 6 | 10 | 11 | 13 | 15 |
| 6 | 2- | 1+ | 2- | 3o | 2o | 2+ | 3- | 2- | 16.3 | 12 | 9 | 13 | 33 | 16 | 20 | 26 | 11 | 18 | 14 |
| 7 | 1- | 1+ | 2o | 2+ | 3o | 3- | 1+ | 3+ | 16.7 | 4 | 10 | 16 | 20 | 33 | 21 | 9 | 35 | 19 | 19 |
| 8 | 3o | 2- | 2- | 3- | 2o | 2+ | 2- | 2o | 17.0 | 27 | 13 | 13 | 23 | 15 | 17 | 12 | 14 | 17 | 20 |
| 9 | 2- | 2+ | 4- | 2+ | 2- | 1- | 2- | 2- | 15.7 | 12 | 17 | 44 | 18 | 11 | 4 | 11 | 11 | 16 | 15 |
| 10 | 2- | 1- | 1- | 3o | 5o | 5- | 4- | 5- | 24.0 | 12 | 4 | 5 | 31 | 99 | 84 | 49 | 85 | 46 | 40 |
| 11 | 5- | 3+ | 4- | 5- | 3+ | 4o | 5- | 4o | 32.3 | 78 | 38 | 47 | 75 | 38 | 60 | 73 | 60 | 59 | 57 |
| 12 | 2+ | 3+ | 3+ | 3- | 3o | 3o | 4- | 4o | 25.3 | 19 | 39 | 36 | 24 | 30 | 33 | 46 | 52 | 35 | 39 |
| 13 | 4- | 3o | 2- | 2o | 4o | 4+ | 2+ | 4+ | 25.3 | 49 | 33 | 13 | 15 | 60 | 64 | 17 | 70 | 40 | 43 |
| 14 | 4+ | 4+ | 3+ | 3+ | 3o | 3- | 4o | 3- | 27.7 | 64 | 62 | 36 | 40 | 29 | 24 | 58 | 25 | 42 | 44 |
| 15 | 3+ | 3+ | 4- | 3+ | 3o | 4- | 4- | 4o | 28.0 | 35 | 35 | 48 | 39 | 32 | 49 | 43 | 59 | 43 | 38 |
| 16 | 4o | 2+ | 3o | 3+ | 3o | 3- | 3- | 3- | 23.7 | 56 | 17 | 28 | 36 | 27 | 24 | 23 | 26 | 30 | 33 |
| 17 | 2- | 3+ | 3- | 3o | 3o | 3- | 3+ | 3o | 22.7 | 13 | 36 | 23 | 30 | 30 | 24 | 34 | 31 | 28 | 24 |
| 18 | 2+ | 2- | 2+ | 2+ | 1+ | 1+ | 1+ | 1+ | 14.0 | 19 | 11 | 18 | 20 | 9 | 10 | 10 | 10 | 13 | 16 |
| 19 | 1+ | 0+ | 0+ | 2- | 1o | 1o | 0+ | 0+ | 6.3 | 9 | 3 | 2 | 11 | 6 | 7 | 3 | 2 | 5 | 7 |
| 20 | 1o | 2o | 1- | 2- | 2+ | 4- | 4- | 2+ | 17.3 | 6 | 15 | 5 | 11 | 18 | 41 | 43 | 19 | 20 | 16 |
| 21 | 2o | 2+ | 2+ | 3- | 3o | 1+ | 1+ | 1+ | 16.3 | 14 | 18 | 17 | 24 | 30 | 10 | 10 | 8 | 16 | 22 |
| 22 | 3o | 3o | 3- | 2o | 2- | 4+ | 4- | 5o | 25.3 | 29 | 30 | 21 | 14 | 11 | 63 | 50 | 94 | 39 | 31 |
| 23 | 4o | 3o | 3o | 2o | 2- | 2- | 2- | 1- | 17.7 | 55 | 30 | 33 | 14 | 11 | 12 | 12 | 5 | 22 | 31 |
| 24 | 3o | 3+ | 2+ | 2+ | 2o | 2o | 2+ | 2+ | 19.7 | 32 | 37 | 18 | 18 | 16 | 14 | 20 | 19 | 22 | 24 |
| 25 | 2+ | 3- | 4- | 5- | 5- | 5o | 5o | 5+ | 33.3 | 18 | 26 | 47 | 78 | 85 | 89 | 101 | 106 | 69 | 48 |
| 26 | 3- | 3+ | 3+ | 4- | 3o | 2+ | 3+ | 1+ | 23.0 | 21 | 40 | 39 | 49 | 33 | 20 | 36 | 10 | 31 | 44 |
| 27 | 3o | 2+ | 2- | 2+ | 2o | 3- | 3o | 3- | 19.7 | 28 | 17 | 12 | 18 | 14 | 22 | 30 | 21 | 20 | 27 |
| 28 | 5- | 2o | 3- | 4o | 3+ | 2+ | 3+ | 3o | 25.3 | 85 | 14 | 23 | 53 | 36 | 20 | 34 | 31 | 37 | 31 |
| 29 | 3o | 3o | 2+ | 3o | 5- | 4+ | 4- | 4- | 27.7 | 32 | 29 | 17 | 30 | 74 | 65 | 47 | 45 | 42 | 46 |
| 30 | 5- | 5- | 4o | 4o | 4o | 5- | 4- | 2+ | 32.0 | 73 | 84 | 59 | 60 | 53 | 79 | 43 | 20 | 59 | 49 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | | 29.8 | |

**OCTOBER 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3o | 2- | 3- | 3- | 2+ | 3- | 3- | 2o | 19.7 | 27 | 12 | 24 | 22 | 18 | 24 | 22 | 15 | 21 | 28 |
| 2 | 2+ | 2- | 2- | 3+ | 2o | 1- | 1+ | 1- | 13.7 | 20 | 12 | 13 | 36 | 15 | 5 | 9 | 4 | 14 | 21 |
| 3 | 1- | 2+ | 4- | 4+ | 5+ | 4o | 5- | 3o | 28.0 | 4 | 18 | 49 | 67 | 104 | 60 | 83 | 31 | 52 | 35 |
| 4 | 3- | 2o | 3- | 4- | 4- | 2o | 1+ | 1o | 19.0 | 23 | 14 | 24 | 45 | 43 | 15 | 8 | 7 | 22 | 31 |
| 5 | 1o | 2- | 1+ | 2+ | 2- | 1+ | 1o | 1+ | 11.7 | 6 | 11 | 8 | 18 | 11 | 10 | 6 | 9 | 10 | 12 |
| 6 | 1- | 1o | 1+ | 2- | 0+ | 1o | 2- | 2- | 9.3 | 4 | 7 | 10 | 11 | 3 | 7 | 12 | 11 | 8 | 9 |
| 7 | 0+ | 1o | 2- | 2+ | 4o | 2- | 1o | 1+ | 13.3 | 2 | 6 | 11 | 17 | 53 | 11 | 7 | 9 | 15 | 14 |
| 8 | 3- | 2- | 2o | 3- | 2- | 2- | 2o | 1o | 15.3 | 22 | 12 | 14 | 25 | 13 | 11 | 14 | 7 | 15 | 13 |
| 9 | 0+ | 1- | 1- | 0o | 0o | 0o | 2o | 2o | 5.7 | 3 | 5 | 5 | 1 | 1 | 1 | 14 | 15 | 6 | 9 |
| 10 | 2+ | 2+ | 1+ | 1- | 1o | 1+ | 2o | 2- | 12.7 | 20 | 18 | 8 | 4 | 6 | 10 | 15 | 11 | 12 | 15 |
| 11 | 3- | 3o | 3+ | 3- | 4- | 5+ | 5- | 3+ | 28.7 | 23 | 33 | 35 | 26 | 47 | 110 | 72 | 39 | 48 | 29 |
| 12 | 2- | 2o | 1o | 1- | 3- | 3- | 2o | 2+ | 15.0 | 13 | 14 | 6 | 4 | 22 | 26 | 14 | 19 | 15 | 29 |
| 13 | 3- | 2- | 3- | 3- | 4o | 4o | 4+ | 4- | 25.7 | 22 | 13 | 23 | 25 | 53 | 51 | 64 | 50 | 38 | 35 |
| 14 | 4o | 3o | 4- | 4- | 3+ | 4+ | 3+ | 3- | 28.0 | 51 | 31 | 45 | 48 | 36 | 69 | 39 | 23 | 43 | 46 |
| 15 | 3- | 4- | 4- | 4o | 4- | 4- | 3+ | 2o | 26.7 | 25 | 48 | 41 | 56 | 45 | 47 | 34 | 14 | 39 | 35 |
| 16 | 2- | 3- | 3o | 2- | 3- | 3+ | 2+ | 2o | 19.3 | 13 | 21 | 33 | 13 | 21 | 34 | 19 | 14 | 21 | 23 |
| 17 | 2- | 1o | 1+ | 3+ | 5- | 4- | 3o | 3- | 21.3 | 13 | 6 | 10 | 35 | 84 | 45 | 32 | 24 | 31 | 23 |
| 18 | 2- | 1+ | 1o | 2- | 1+ | 1o | 1- | 0+ | 9.0 | 11 | 8 | 7 | 11 | 8 | 7 | 4 | 2 | 7 | 17 |
| 19 | 1o | 1o | 0o | 2o | 2+ | 2o | 1+ | 1+ | 11.0 | 6 | 6 | 1 | 16 | 19 | 15 | 8 | 10 | 10 | 8 |
| 20 | 1- | 1- | 1o | 1o | 2- | 2o | 2o | 3+ | 12.3 | 4 | 5 | 6 | 7 | 13 | 16 | 14 | 40 | 13 | 14 |
| 21 | 3- | 2- | 2- | 2o | 2+ | 3o | 4o | 1+ | 18.7 | 22 | 13 | 11 | 16 | 20 | 31 | 59 | 10 | 23 | 18 |
| 22 | 1o | 1+ | 1o | 1o | 1- | 1+ | 2+ | 3- | 11.3 | 7 | 8 | 7 | 7 | 5 | 8 | 18 | 24 | 11 | 17 |
| 23 | 3- | 3- | 2- | 2+ | 2o | 3+ | 1o | 0+ | 16.0 | 23 | 22 | 11 | 18 | 14 | 38 | 6 | 3 | 17 | 16 |
| 24 | 2- | 2- | 2o | 3o | 2+ | 3- | 5- | 4o | 22.0 | 12 | 12 | 16 | 27 | 17 | 23 | 83 | 51 | 30 | 32 |
| 25 | 4- | 4o | 4- | 4o | 4- | 2- | 2+ | 3- | 25.7 | 47 | 57 | 41 | 60 | 43 | 11 | 18 | 24 | 38 | 35 |
| 26 | 1o | 2+ | 3o | 3+ | 3o | 2+ | 1+ | 2- | 18.0 | 7 | 19 | 28 | 34 | 27 | 20 | 8 | 11 | 19 | 27 |
| 27 | 3+ | 3- | 4o | 4+ | 4+ | 5- | 5- | 4+ | 32.3 | 35 | 23 | 56 | 64 | 62 | 72 | 77 | 68 | 57 | 52 |
| 28 | 5o | 5- | 4+ | 5- | 4o | 5- | 4o | 3- | 34.0 | 100 | 71 | 63 | 80 | 59 | 82 | 60 | 24 | 67 | 58 |
| 29 | 3o | 3o | 3- | 3o | 3+ | 2+ | 3- | 2+ | 22.3 | 33 | 29 | 22 | 30 | 39 | 19 | 26 | 20 | 27 | 35 |
| 30 | 2+ | 3- | 3o | 3+ | 3- | 1+ | 2+ | 2o | 19.7 | 20 | 25 | 28 | 37 | 21 | 8 | 17 | 16 | 22 | 21 |
| 31 | 1o | 2- | 2+ | 3- | 3- | 2+ | 3o | 2- | 17.3 | 7 | 13 | 19 | 21 | 21 | 18 | 32 | 13 | 18 | 16 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | | 24.8 | |

**NOVEMBER 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o | 2o | 2- | 2o | 2- | 2o | 1o | 1- | 13.0 | 15 | 14 | 13 | 15 | 13 | 15 | 7 | 4 | 12 | 15 |
| 2 | 2- | 2- | 3- | 2+ | 3- | 4+ | 5o | 5- | 25.0 | 12 | 13 | 21 | 18 | 26 | 62 | 101 | 72 | 41 | 29 |
| 3 | 3+ | 3o | 2+ | 3- | 3+ | 4+ | 5o | 4o | 28.0 | 38 | 27 | 17 | 22 | 39 | 70 | 101 | 52 | 46 | 43 |
| 4 | 3o | 2o | 2+ | 1o | 2o | 1+ | 2- | 2+ | 15.7 | 28 | 16 | 17 | 7 | 16 | 8 | 13 | 18 | 15 | 27 |
| 5 | 1o | 1- | 2o | 3- | 2- | 3o | 3- | 3+ | 17.0 | 6 | 5 | 14 | 24 | 11 | 27 | 23 | 37 | 18 | 17 |
| 6 | 2- | 3- | 2- | 2+ | 3- | 2- | 2+ | 2o | 17.0 | 11 | 22 | 11 | 19 | 22 | 13 | 17 | 14 | 16 | 18 |
| 7 | 2- | 3o | 2- | 1+ | 1o | 1+ | 0+ | 1+ | 11.7 | 11 | 30 | 11 | 9 | 6 | 8 | 3 | 8 | 11 | 12 |
| 8 | 1+ | 1+ | 2- | 1+ | 1+ | 1o | 1o | 1- | 9.7 | 8 | 8 | 12 | 8 | 9 | 6 | 6 | 4 | 8 | 7 |
| 9 | 0+ | 1- | 2- | 2- | 3- | 2- | 2+ | 4o | 15.0 | 2 | 4 | 12 | 13 | 23 | 13 | 19 | 51 | 17 | 17 |
| 10 | 3o | 2+ | 3- | 3o | 2+ | 1o | 1+ | 2+ | 18.0 | 31 | 20 | 24 | 32 | 20 | 7 | 9 | 17 | 20 | 22 |
| 11 | 2o | 2+ | 3+ | 3- | 2o | 2+ | 3- | 3o | 20.3 | 14 | 20 | 34 | 22 | 15 | 17 | 21 | 33 | 22 | 23 |
| 12 | 4o | 2+ | 3+ | 3o | 2- | 2+ | 4- | 4o | 24.3 | 53 | 17 | 40 | 29 | 13 | 17 | 48 | 56 | 34 | 31 |
| 13 | 3+ | 3- | 3o | 3+ | 4o | 4o | 3- | 3+ | 26.3 | 38 | 26 | 31 | 39 | 56 | 60 | 21 | 34 | 38 | 35 |
| 14 | 3o | 3+ | 2+ | 3+ | 3o | 4- | 3o | 3- | 24.3 | 29 | 39 | 19 | 39 | 33 | 50 | 29 | 23 | 33 | 33 |
| 15 | 3o | 2o | 2+ | 3- | 3- | 3- | 3- | 2+ | 20.3 | 30 | 14 | 19 | 26 | 21 | 22 | 22 | 19 | 22 | 23 |
| 16 | 2o | 2+ | 1+ | 1+ | 1+ | 2o | 1+ | 1+ | 13.0 | 15 | 19 | 8 | 10 | 8 | 16 | 8 | 8 | 12 | 12 |
| 17 | 1o | 1- | 0+ | 0+ | 0o | 0+ | 0+ | 0+ | 3.3 | 7 | 5 | 3 | 2 | 1 | 3 | 3 | 3 | 3 | 6 |
| 18 | 1- | 1+ | 1+ | 0+ | 1o | 1+ | 2- | 2+ | 10.0 | 5 | 10 | 8 | 3 | 7 | 8 | 12 | 19 | 9 | 10 |
| 19 | 1+ | 3- | 3- | 3- | 2+ | 3o | 2- | 1+ | 17.7 | 10 | 22 | 23 | 25 | 20 | 27 | 13 | 8 | 19 | 17 |
| 20 | 2o | 3- | 3- | 2o | 2- | 3- | 3- | 2- | 18.0 | 14 | 21 | 26 | 15 | 13 | 24 | 24 | 13 | 19 | 17 |
| 21 | 2- | 2o | 2- | 2o | 1+ | 1- | 2- | 0+ | 11.3 | 12 | 15 | 13 | 15 | 8 | 4 | 11 | 3 | 10 | 13 |
| 22 | 2- | 2o | 2o | 2o | 1+ | 1+ | 2- | 2- | 13.7 | 12 | 15 | 15 | 15 | 10 | 10 | 12 | 11 | 13 | 19 |
| 23 | 1+ | 2o | 4+ | 5- | 5o | 3+ | 5o | 4- | 29.3 | 10 | 16 | 68 | 82 | 96 | 36 | 98 | 46 | 57 | 41 |
| 24 | 3+ | 3o | 3+ | 4+ | 4+ | 3+ | 2+ | 3- | 26.7 | 36 | 27 | 36 | 67 | 61 | 39 | 20 | 25 | 39 | 41 |
| 25 | 2o | 2+ | 2+ | 2- | 4- | 3o | 2- | 2- | 18.3 | 14 | 18 | 20 | 12 | 41 | 30 | 13 | 13 | 20 | 24 |
| 26 | 2+ | 3- | 2o | 3- | 3+ | 4- | 2+ | 3o | 22.0 | 17 | 23 | 15 | 23 | 35 | 42 | 17 | 32 | 26 | 27 |
| 27 | 3- | 3- | 4- | 3+ | 4- | 4- | 3- | 2+ | 24.7 | 22 | 21 | 43 | 39 | 45 | 44 | 22 | 18 | 32 | 28 |
| 28 | 2- | 2- | 2o | 3o | 2o | 2+ | 2+ | 2- | 16.7 | 13 | 12 | 14 | 32 | 15 | 18 | 19 | 12 | 17 | 19 |
| 29 | 2- | 1+ | 1- | 1+ | 1- | 1o | 1o | 0o | 7.7 | 12 | 10 | 4 | 10 | 5 | 7 | 6 | 1 | 7 | 8 |
| 30 | 0o | 0o | 0o | 2- | 1o | 1+ | 2o | 2- | 7.7 | 1 | 0 | 1 | 11 | 6 | 8 | 15 | 12 | 7 | 7 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | | 21.4 | |

**DECEMBER 1987**

| | Km | | | | | | | | ΣKn | am | | | | | | | Am | Am2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2- | 1+ | 1+ | 2o | 1+ | 1+ | 2o | 1o | 12.0 | 11 | 10 | 8 | 14 | 9 | 8 | 15 | 7 | 10 | 10 |
| 2 | 2+ | 1+ | 1o | 0+ | 2o | 2o | 1+ | 1o | 11.3 | 17 | 8 | 7 | 3 | 14 | 15 | 8 | 7 | 10 | 12 |
| 3 | 2+ | 3o | 2+ | 2o | 2+ | 4- | 2o | 2+ | 20.0 | 17 | 30 | 18 | 14 | 18 | 46 | 15 | 20 | 22 | 16 |
| 4 | 2- | 1o | 1o | 1- | 1+ | 2+ | 3- | 4o | 14.7 | 11 | 6 | 6 | 4 | 8 | 19 | 25 | 56 | 17 | 24 |
| 5 | 3+ | 3o | 4- | 3+ | 3- | 3- | 3o | 1+ | 23.0 | 36 | 31 | 48 | 37 | 23 | 24 | 30 | 10 | 30 | 24 |
| 6 | 1- | 2- | 1+ | 1o | 2o | 2+ | 2o | 3- | 13.7 | 4 | 11 | 10 | 6 | 15 | 18 | 14 | 22 | 13 | 13 |
| 7 | 2- | 1+ | 1o | 0+ | 1+ | 1+ | 1o | 0o | 8.0 | 11 | 8 | 6 | 3 | 8 | 10 | 7 | 1 | 7 | 8 |
| 8 | 0+ | 0+ | 0o | 0o | 0+ | 0o | 0+ | 0+ | 1.7 | 2 | 2 | 1 | 1 | 3 | 1 | 2 | 3 | 2 | 4 |
| 9 | 1o | 1- | 0+ | 1o | 1- | 1- | 3o | 4o | 11.3 | 6 | 4 | 2 | 6 | 5 | 5 | 31 | 51 | 14 | 13 |
| 10 | 3- | 2+ | 2+ | 3o | 4- | 5- | 5- | 3+ | 26.7 | 24 | 20 | 19 | 31 | 49 | 72 | 84 | 39 | 42 | 33 |
| 11 | 4o | 2+ | 1o | 2- | 2+ | 3o | 3o | 3- | 20.0 | 59 | 20 | 7 | 11 | 19 | 29 | 33 | 23 | 25 | 33 |
| 12 | 3- | 3- | 2o | 3- | 2+ | 1+ | 1o | 1- | 15.3 | 23 | 22 | 15 | 23 | 18 | 10 | 7 | 4 | 15 | 15 |
| 13 | 1- | 0+ | 1o | 1- | 1- | 2- | 1o | 1- | 6.7 | 4 | 3 | 7 | 5 | 5 | 11 | 6 | 5 | 6 | 7 |
| 14 | 1o | 1o | 1o | 1- | 1+ | 1o | 1o | 1+ | 8.3 | 6 | 7 | 6 | 5 | 9 | 6 | 7 | 10 | 7 | 6 |
| 15 | 0+ | 0+ | 1o | 1o | 2o | 4- | 3+ | 3o | 14.7 | 3 | 2 | 6 | 7 | 14 | 48 | 40 | 27 | 18 | 25 |
| 16 | 4o | 4o | 4o | 4o | 4o | 4o | 3- | 3+ | 30.0 | 59 | 59 | 54 | 53 | 55 | 56 | 26 | 37 | 50 | 38 |
| 17 | 2+ | 3- | 1+ | 3o | 4- | 3- | 3- | 3- | 21.0 | 18 | 24 | 9 | 27 | 42 | 24 | 22 | 24 | 24 | 27 |
| 18 | 2+ | 2o | 2o | 2- | 1+ | 1o | 1- | 1- | 11.7 | 20 | 16 | 14 | 12 | 8 | 6 | 4 | 5 | 11 | 15 |
| 19 | 1- | 1o | 1o | 3- | 2o | 2- | 3- | 1o | 12.7 | 4 | 7 | 7 | 22 | 15 | 13 | 22 | 7 | 12 | 9 |
| 20 | 0+ | 1o | 1o | 1+ | 2o | 1+ | 1+ | 0o | 8.3 | 3 | 7 | 6 | 10 | 16 | 10 | 9 | 1 | 8 | 10 |
| 21 | 1- | 2o | 1+ | 2o | 2+ | 2+ | 3o | 3- | 16.3 | 5 | 15 | 8 | 16 | 19 | 17 | 29 | 26 | 17 | 17 |
| 22 | 3+ | 3- | 2+ | 3o | 3o | 3- | 4- | 4- | 24.3 | 37 | 21 | 20 | 27 | 32 | 24 | 42 | 42 | 31 | 26 |
| 23 | 2+ | 3- | 2+ | 2o | 2+ | 2+ | 1+ | 0+ | 15.7 | 17 | 26 | 17 | 14 | 20 | 18 | 9 | 3 | 16 | 19 |
| 24 | 1o | 2- | 2- | 2o | 2- | 2- | 1+ | 2o | 13.0 | 6 | 12 | 11 | 16 | 12 | 13 | 10 | 15 | 12 | 12 |
| 25 | 1+ | 2- | 2- | 2o | 2o | 1+ | 1o | 2+ | 13.3 | 9 | 12 | 11 | 14 | 16 | 8 | 7 | 20 | 12 | 11 |
| 26 | 1+ | 1+ | 0+ | 1+ | 1+ | 1+ | 1o | 1- | 8.7 | 9 | 9 | 3 | 10 | 8 | 8 | 6 | 4 | 7 | 7 |
| 27 | 1- | 0+ | 0o | 0o | 0o | 0o | 0+ | 0o | 1.3 | 4 | 2 | 1 | 1 | 0 | 1 | 3 | 1 | 2 | 3 |
| 28 | 0o | 0o | 0+ | 0+ | 1- | 0o | 2- | 1+ | 4.3 | 1 | 1 | 3 | 3 | 5 | 1 | 12 | 9 | 4 | 5 |
| 29 | 1+ | 2o | 2o | 1+ | 0+ | 0o | 1- | 1o | 8.7 | 9 | 14 | 15 | 8 | 3 | 1 | 4 | 7 | 8 | 7 |
| 30 | 1- | 0+ | 1o | 1+ | 1o | 0+ | 0+ | 0o | 5.0 | 5 | 3 | 7 | 9 | 6 | 2 | 3 | 1 | 5 | 5 |
| 31 | 1- | 1o | 1o | 2- | 2- | 1+ | 2o | 1+ | 10.7 | 4 | 6 | 6 | 11 | 11 | 8 | 14 | 8 | 9 | 7 |
| | | | | | | | | | | Monthly mean value of Am | | | | | | | | 15.0 | |

## MONTHLY AND YEARLY **Am** 1959 - 1987

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1959 | 25.5 | 35.7 | 30.1 | 24.1 | 25.5 | 22.7 | 42.1 | 31.5 | 36.9 | 28.2 | 33.0 | 31.6 | 30.6 |
| 1960 | 25.7 | 23.5 | 27.3 | 53.4 | 31.5 | 27.3 | 27.3 | 27.8 | 27.0 | 45.0 | 44.4 | 32.1 | 32.7 |
| 1961 | 19.4 | 24.0 | 21.3 | 20.6 | 21.1 | 20.3 | 34.4 | 17.8 | 19.4 | 21.9 | 15.7 | 19.6 | 21.3 |
| 1962 | 12.9 | 18.3 | 14.0 | 21.6 | 12.7 | 17.0 | 19.8 | 24.9 | 27.8 | 29.8 | 20.4 | 21.1 | 20.0 |
| 1963 | 17.2 | 13.9 | 13.2 | 15.4 | 17.8 | 17.9 | 19.4 | 21.2 | 38.0 | 22.2 | 19.0 | 16.8 | 19.3 |
| 1964 | 17.8 | 17.5 | 19.0 | 19.7 | 15.9 | 13.7 | 15.3 | 13.3 | 16.1 | 15.0 | 12.4 | 9.2 | 15.4 |
| 1965 | 10.8 | 14.6 | 13.2 | 11.5 | 9.7 | 14.8 | 13.6 | 14.8 | 16.1 | 11.8 | 10.8 | 12.2 | 12.8 |
| 1966 | 12.8 | 13.2 | 17.8 | 11.0 | 14.0 | 11.6 | 15.4 | 18.2 | 28.2 | 16.1 | 15.3 | 18.5 | 16.0 |
| 1967 | 17.6 | 18.4 | 11.9 | 14.0 | 32.7 | 17.7 | 12.8 | 15.3 | 23.9 | 16.7 | 17.4 | 23.2 | 18.5 |
| 1968 | 19.3 | 25.0 | 21.8 | 20.2 | 21.5 | 24.2 | 16.3 | 18.5 | 21.0 | 24.0 | 25.1 | 17.7 | 21.2 |
| 1969 | 15.2 | 23.5 | 26.0 | 22.4 | 23.5 | 15.6 | 12.3 | 13.4 | 21.6 | 14.4 | 16.8 | 11.9 | 18.0 |
| 1970 | 12.5 | 11.1 | 24.9 | 20.9 | 14.0 | 16.2 | 25.4 | 18.4 | 17.6 | 19.1 | 19.8 | 14.9 | 17.9 |
| 1971 | 20.9 | 19.0 | 18.3 | 23.2 | 20.3 | 15.7 | 13.7 | 15.9 | 20.0 | 19.4 | 16.9 | 18.1 | 18.4 |
| 1972 | 20.5 | 16.8 | 18.9 | 17.3 | 16.2 | 20.9 | 12.8 | 32.2 | 19.3 | 19.4 | 21.1 | 16.9 | 19.4 |
| 1973 | 24.9 | 29.8 | 34.8 | 39.4 | 25.9 | 26.5 | 20.4 | 20.0 | 21.8 | 27.3 | 20.0 | 19.1 | 25.8 |
| 1974 | 24.1 | 25.2 | 33.6 | 31.5 | 28.0 | 27.2 | 33.1 | 30.3 | 33.4 | 37.1 | 27.1 | 26.0 | 29.7 |
| 1975 | 25.8 | 29.5 | 30.7 | 24.7 | 23.2 | 19.8 | 21.3 | 17.8 | 15.9 | 18.4 | 28.8 | 20.2 | 23.0 |
| 1976 | 21.9 | 26.7 | 33.4 | 26.3 | 22.9 | 16.8 | 16.2 | 15.9 | 21.8 | 19.2 | 15.2 | 18.0 | 21.2 |
| 1977 | 18.4 | 19.9 | 18.7 | 25.0 | 18.8 | 13.8 | 22.9 | 22.5 | 23.8 | 20.7 | 16.8 | 16.8 | 19.8 |
| 1978 | 24.6 | 25.3 | 25.9 | 32.2 | 32.5 | 28.2 | 18.8 | 24.3 | 26.8 | 19.7 | 24.2 | 22.0 | 25.4 |
| 1979 | 26.5 | 24.2 | 27.6 | 35.3 | 21.7 | 17.5 | 18.0 | 25.8 | 21.2 | 18.7 | 17.0 | 16.3 | 22.5 |
| 1980 | 18.1 | 18.0 | 11.9 | 17.4 | 15.1 | 19.4 | 16.2 | 16.0 | 13.8 | 22.6 | 22.5 | 22.6 | 17.8 |
| 1981 | 16.4 | 23.3 | 28.5 | 35.9 | 28.5 | 17.8 | 28.7 | 24.2 | 19.9 | 34.6 | 25.0 | 18.6 | 25.1 |
| 1982 | 20.7 | 48.3 | 26.9 | 31.8 | 26.0 | 32.1 | 43.7 | 32.3 | 50.5 | 29.2 | 34.6 | 35.5 | 34.3 |
| 1983 | 25.7 | 39.4 | 34.5 | 35.3 | 32.1 | 24.2 | 21.8 | 25.9 | 23.1 | 27.4 | 32.0 | 24.2 | 28.8 |
| 1984 | 20.6 | 25.7 | 30.6 | 34.2 | 26.6 | 23.8 | 26.9 | 25.8 | 33.1 | 33.5 | 31.5 | 28.1 | 28.4 |
| 1985 | 25.0 | 23.4 | 17.7 | 30.3 | 14.8 | 19.6 | 24.4 | 22.3 | 20.9 | 23.0 | 23.5 | 21.5 | 22.2 |
| 1986 | 21.5 | 40.5 | 20.7 | 13.5 | 18.5 | 15.2 | 15.0 | 22.5 | 25.7 | 18.0 | 20.8 | 14.7 | 20.5 |
| 1987 | 13.6 | 16.7 | 16.9 | 11.8 | 13.5 | 12.8 | 17.3 | 23.6 | 29.8 | 24.8 | 21.4 | 15.0 | 18,1 |

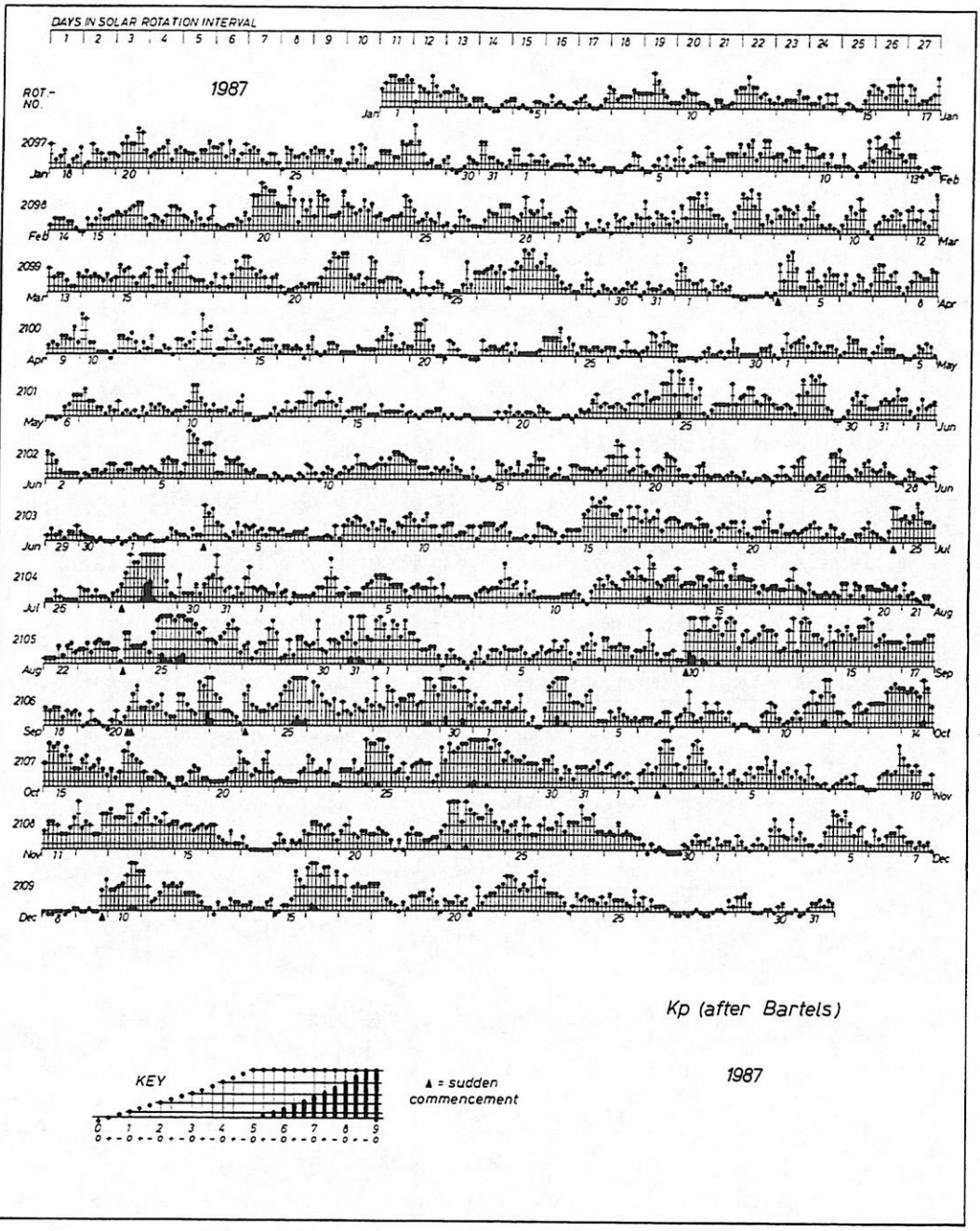
Unit : nT

# SECTION 3

## 3.3. Kp INDICES


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  1932 - 1987 81

# MUSICAL DIAGRAM OF **Kp** 1987



# Kp INDICES 1987

| | Kp | | | | | | | | Sum | Jan 1987 | | | | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2+ | 3o | 4- | 4- | 3+ | 3+ | 4- | 3+ | 26+ | 9 | 15 | 22 | 22 | 18 | 18 | 22 | 18 | 144 | 18 | 1.0 |
| 2 | 1o | 3- | 2+ | 2o | 4- | 3- | 2- | 2o | 18o | 4 | 12 | 9 | 7 | 22 | 12 | 6 | 7 | 79 | 10 | 0.6 |
| 3 | 2o | 3- | 2+ | 2- | 1+ | 1- | 1+ | 1+ | 13+ | 7 | 12 | 9 | 6 | 5 | 3 | 5 | 5 | 52 | 6 | 0.3 |
| 4 | 1+ | 1- | 0+ | 0o | 0o | 1- | 1o | 1+ | 5+ | 5 | 3 | 2 | 0 | 0 | 3 | 4 | 5 | 22 | 3 | 0.0 |
| 5 | 1+ | 0+ | 1- | 0+ | 0o | 1o | 1o | 1- | 5+ | 5 | 2 | 3 | 2 | 0 | 4 | 4 | 3 | 23 | 3 | 0.1 |
| 6 | 1- | 2- | 1- | 1o | 1- | 0+ | 0+ | 1o | 6+ | 3 | 6 | 3 | 4 | 3 | 2 | 2 | 4 | 27 | 3 | 0.1 |
| 7 | 1+ | 2- | 1- | 0+ | 0+ | 1- | 1+ | 3- | 9o | 5 | 6 | 3 | 2 | 2 | 3 | 5 | 12 | 38 | 5 | 0.2 |
| 8 | 2+ | 1+ | 2- | 2- | 2- | 2+ | 2o | 2o | 15o | 9 | 5 | 6 | 6 | 6 | 9 | 7 | 7 | 55 | 7 | 0.3 |
| 9 | 2o | 2o | 4o | 3+ | 2+ | 2- | 1o | 1o | 17+ | 7 | 7 | 27 | 18 | 9 | 6 | 4 | 4 | 82 | 10 | 0.6 |
| 10 | 1o | 2- | 2+ | 2o | 2o | 1o | 1o | 1- | 12- | 4 | 6 | 9 | 7 | 7 | 4 | 4 | 3 | 44 | 6 | 0.2 |
| 11 | 0+ | 1+ | 1+ | 1- | 1- | 1o | 2+ | 3- | 10+ | 2 | 5 | 5 | 3 | 3 | 4 | 9 | 12 | 43 | 5 | 0.2 |
| 12 | 3- | 4- | 3- | 3- | 2- | 2o | 1+ | 1o | 18- | 12 | 22 | 12 | 12 | 6 | 7 | 5 | 4 | 80 | 10 | 0.6 |
| 13 | 2- | 1o | 1+ | 1+ | 1+ | 2+ | 2- | 2- | 12+ | 6 | 4 | 5 | 5 | 5 | 9 | 6 | 6 | 46 | 6 | 0.3 |
| 14 | 1o | 1o | 2- | 1- | 2o | 1o | 2o | 0+ | 10- | 4 | 4 | 6 | 3 | 7 | 4 | 7 | 2 | 37 | 5 | 0.2 |
| 15 | 0+ | 1o | 1- | 0+ | 0+ | 1+ | 2+ | 3o | 9+ | 2 | 4 | 3 | 2 | 2 | 5 | 9 | 15 | 42 | 5 | 0.2 |
| 16 | 3- | 2+ | 2- | 3o | 3o | 4- | 3o | 1+ | 21- | 12 | 9 | 6 | 15 | 15 | 22 | 15 | 5 | 99 | 12 | 0.7 |
| 17 | 3o | 3- | 1o | 1+ | 1+ | 2- | 2o | 4- | 17- | 15 | 12 | 4 | 5 | 5 | 6 | 7 | 22 | 76 | 10 | 0.5 |
| 18 | 3o | 1+ | 2- | 2+ | 1- | 1+ | 2- | 3- | 15- | 15 | 5 | 6 | 9 | 3 | 5 | 6 | 12 | 61 | 8 | 0.4 |
| 19 | 1- | 1o | 3o | 2+ | 2o | 1+ | 2o | 2o | 14+ | 3 | 4 | 15 | 9 | 7 | 5 | 7 | 7 | 57 | 7 | 0.4 |
| 20 | 2- | 3o | 4- | 3o | 3o | 4+ | 4o | 2+ | 25o | 6 | 15 | 22 | 15 | 15 | 32 | 27 | 9 | 141 | 18 | 1.0 |
| 21 | 2- | 2o | 2+ | 3- | 3+ | 1+ | 2+ | 3- | 18+ | 6 | 7 | 9 | 12 | 18 | 5 | 9 | 12 | 78 | 10 | 0.5 |
| 22 | 2+ | 2o | 2o | 1+ | 2+ | 2+ | 3+ | 3- | 18+ | 9 | 7 | 7 | 5 | 9 | 9 | 18 | 12 | 76 | 10 | 0.5 |
| 23 | 3- | 3o | 2- | 3+ | 2+ | 1+ | 2o | 3o | 19+ | 12 | 15 | 6 | 18 | 9 | 5 | 7 | 15 | 87 | 11 | 0.6 |
| 24 | 2+ | 3- | 2+ | 1+ | 1o | 2o | 2o | 1o | 15- | 9 | 12 | 9 | 5 | 4 | 7 | 7 | 4 | 57 | 7 | 0.4 |
| 25 | 0+ | 3- | 2+ | 2- | 2- | 2o | 2- | 2+ | 15- | 2 | 12 | 9 | 6 | 6 | 7 | 6 | 9 | 57 | 7 | 0.4 |
| 26 | 3- | 2+ | 2+ | 2- | 2+ | 1+ | 1+ | 0+ | 14+ | 12 | 9 | 9 | 6 | 9 | 5 | 5 | 2 | 57 | 7 | 0.4 |
| 27 | 1o | 3- | 1+ | 3o | 3- | 1- | 1- | 1o | 13o | 4 | 12 | 5 | 15 | 12 | 3 | 3 | 4 | 58 | 7 | 0.4 |
| 28 | 2+ | 2+ | 2+ | 2- | 2- | 3+ | 3o | 3+ | 20o | 9 | 9 | 9 | 6 | 6 | 18 | 15 | 18 | 90 | 11 | 0.6 |
| 29 | 5- | 3+ | 2o | 1o | 1+ | 1- | 1- | 1+ | 15o | 39 | 18 | 7 | 4 | 5 | 3 | 3 | 5 | 84 | 10 | 0.6 |
| 30 | 2- | 0+ | 0o | 0+ | 1- | 2- | 1+ | 1o | 7o | 6 | 2 | 0 | 2 | 3 | 6 | 5 | 4 | 28 | 4 | 0.1 |
| 31 | 3+ | 3+ | 2- | 2- | 1+ | 1o | 1- | 1+ | 14+ | 18 | 18 | 6 | 6 | 5 | 4 | 3 | 5 | 65 | 8 | 0.4 |

| | Kp | | | | | | | | Sum | Feb 1987 | | | | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3- | 3- | 1o | 1o | 2o | 1+ | 1+ | 2o | 14o | 12 | 12 | 4 | 4 | 7 | 5 | 5 | 7 | 56 | 7 | 0.4 |
| 2 | 1+ | 1- | 1o | 1o | 1o | 2o | 1o | 0+ | 8+ | 5 | 3 | 4 | 4 | 4 | 7 | 4 | 2 | 33 | 4 | 0.1 |
| 3 | 2- | 1+ | 2- | 1o | 0+ | 0+ | 1- | 1- | 8- | 6 | 5 | 6 | 4 | 2 | 2 | 3 | 3 | 31 | 4 | 0.1 |
| 4 | 1- | 0+ | 0+ | 1- | 1o | 2+ | 2o | 1- | 8o | 3 | 2 | 2 | 3 | 4 | 9 | 7 | 3 | 33 | 4 | 0.1 |
| 5 | 0+ | 0+ | 1o | 2- | 1- | 2o | 1- | 2- | 8+ | 2 | 2 | 4 | 6 | 3 | 7 | 3 | 6 | 33 | 4 | 0.1 |
| 6 | 3o | 2- | 0+ | 1o | 2o | 1+ | 1+ | 3o | 14- | 15 | 6 | 2 | 4 | 7 | 5 | 5 | 15 | 59 | 7 | 0.4 |
| 7 | 2+ | 2- | 2- | 2- | 2+ | 2+ | 2+ | 3+ | 18- | 9 | 6 | 6 | 6 | 9 | 9 | 9 | 18 | 72 | 9 | 0.5 |
| 8 | 2+ | 3+ | 4- | 2- | 2+ | 4- | 4- | 2o | 23- | 9 | 18 | 22 | 6 | 9 | 22 | 22 | 7 | 115 | 14 | 0.8 |
| 9 | 2+ | 2+ | 2- | 3o | 3- | 3- | 1o | 3+ | 19o | 9 | 9 | 6 | 15 | 12 | 12 | 4 | 18 | 85 | 11 | 0.6 |
| 10 | 3o | 3o | 2o | 2+ | 1+ | 2+ | 1o | 1o | 16o | 15 | 15 | 7 | 9 | 5 | 9 | 4 | 4 | 68 | 8 | 0.5 |
| 11 | 2+ | 1o | 1- | 0o | 1o | 1+ | 4- | 2- | 12- | 9 | 4 | 3 | 0 | 4 | 5 | 22 | 6 | 53 | 7 | 0.3 |
| 12 | 4o | 3o | 3+ | 3- | 4o | 4+ | 2+ | 2- | 25+ | 27 | 15 | 18 | 12 | 27 | 32 | 9 | 6 | 146 | 18 | 1.0 |
| 13 | 2+ | 2+ | 1o | 0o | 1- | 0+ | 1o | 1o | 9- | 9 | 9 | 4 | 0 | 3 | 2 | 4 | 4 | 35 | 4 | 0.2 |
| 14 | 1o | 2- | 2- | 2- | 1+ | 1+ | 1- | 0+ | 10- | 4 | 6 | 6 | 6 | 5 | 5 | 3 | 2 | 37 | 5 | 0.2 |
| 15 | 0+ | 2- | 1o | 2- | 3- | 2- | 2- | 2o | 13- | 2 | 6 | 4 | 6 | 12 | 6 | 6 | 7 | 49 | 6 | 0.3 |
| 16 | 2+ | 2o | 2+ | 3- | 3o | 3+ | 3+ | 2- | 21- | 9 | 7 | 9 | 12 | 15 | 18 | 18 | 6 | 94 | 12 | 0.7 |
| 17 | 1o | 2o | 2- | 1+ | 2o | 3o | 3o | 3- | 17- | 4 | 7 | 6 | 5 | 7 | 15 | 15 | 12 | 71 | 9 | 0.5 |
| 18 | 2o | 2- | 1+ | 2+ | 2- | 1o | 2- | 3o | 15- | 7 | 6 | 5 | 9 | 6 | 4 | 6 | 15 | 58 | 7 | 0.4 |
| 19 | 1o | 1- | 1- | 1o | 1o | 2- | 1+ | 2+ | 10- | 4 | 3 | 3 | 4 | 4 | 6 | 5 | 9 | 38 | 5 | 0.2 |
| 20 | 2- | 4o | 4o | 5o | 5- | 4+ | 4+ | 3+ | 31+ | 6 | 27 | 27 | 48 | 39 | 32 | 32 | 18 | 229 | 29 | 1.3 |
| 21 | 3o | 3o | 5- | 4- | 1+ | 4- | 3- | 4- | 26- | 15 | 15 | 39 | 22 | 5 | 22 | 12 | 22 | 152 | 19 | 1.0 |
| 22 | 2o | 4+ | 4o | 4- | 2o | 2o | 2+ | 4+ | 25- | 7 | 32 | 27 | 22 | 7 | 7 | 9 | 32 | 143 | 18 | 1.0 |
| 23 | 3+ | 3o | 2+ | 3- | 4- | 3- | 3+ | 2o | 23o | 18 | 15 | 9 | 12 | 22 | 12 | 18 | 7 | 113 | 14 | 0.8 |
| 24 | 2+ | 2- | 2- | 2o | 2o | 2+ | 4o | 4- | 20- | 9 | 6 | 6 | 7 | 7 | 9 | 27 | 22 | 93 | 12 | 0.7 |
| 25 | 3- | 1+ | 2- | 2+ | 2- | 1+ | 2+ | 1o | 14+ | 12 | 5 | 6 | 9 | 6 | 5 | 9 | 4 | 56 | 7 | 0.4 |
| 26 | 1+ | 0+ | 1o | 3- | 2o | 2- | 1+ | 1+ | 12- | 5 | 2 | 4 | 12 | 7 | 6 | 5 | 5 | 46 | 6 | 0.3 |
| 27 | 1+ | 2- | 3- | 2+ | 2+ | 3+ | 3+ | 3+ | 20+ | 5 | 6 | 12 | 9 | 9 | 18 | 18 | 18 | 95 | 12 | 0.7 |
| 28 | 2o | 2- | 2+ | 4o | 3- | 2+ | 3- | 4- | 21+ | 7 | 6 | 9 | 27 | 12 | 9 | 12 | 22 | 104 | 13 | 0.7 |

# Kp INDICES 1987 (continued)

| | Kp | Sum | Mar 1987 ap | | | | | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2o 2+ 1+ 1+ | 2- 3- 3o 3- | 17o | 7 | 9 | 5 | 5 | 6 | 12 | 15 | 12 | 71 | 9 | 0.5 |
| 2 | 0o 0+ 1+ 1- | 1- 2- 1- 1+ | 7- | 0 | 2 | 5 | 3 | 3 | 6 | 3 | 5 | 27 | 3 | 0.1 |
| 3 | 0+ 2+ 2- 2o | 1o 1+ 2+ 2o | 13o | 2 | 9 | 6 | 7 | 4 | 5 | 9 | 7 | 49 | 6 | 0.3 |
| 4 | 4- 2o 1+ 3- | 2+ 2o 1+ 3- | 18o | 22 | 7 | 5 | 12 | 9 | 7 | 5 | 12 | 79 | 10 | 0.6 |
| 5 | 2- 3+ 2o 4o | 4o 4+ 3+ 4+ | 27o | 6 | 18 | 7 | 27 | 27 | 32 | 18 | 32 | 167 | 21 | 1.1 |
| 6 | 3o 2+ 2+ 2o | 1+ 1- 3- 3+ | 18- | 15 | 9 | 9 | 7 | 5 | 3 | 12 | 18 | 78 | 10 | 0.5 |
| 7 | 4+ 4o 5- 3+ | 4+ 1+ 2+ 2- | 26o | 32 | 27 | 39 | 18 | 32 | 5 | 9 | 6 | 168 | 21 | 1.1 |
| 8 | 3o 2+ 3+ 3o | 3- 3+ 1+ 2o | 21o | 15 | 9 | 18 | 15 | 12 | 18 | 5 | 7 | 99 | 12 | 0.7 |
| 9 | 3+ 4- 2+ 1+ | 1o 1+ 1o 1- | 15- | 18 | 22 | 9 | 5 | 4 | 5 | 4 | 3 | 70 | 9 | 0.5 |
| 10 | 1+ 2+ 3+ 3- | 4o 3o 1- 0o | 17+ | 5 | 9 | 18 | 12 | 27 | 15 | 3 | 0 | 89 | 11 | 0.6 |
| 11 | 1+ 2- 2+ 2o | 2+ 3o 3- 1+ | 17- | 5 | 6 | 9 | 7 | 9 | 15 | 12 | 5 | 68 | 8 | 0.5 |
| 12 | 3o 3+ 2o 3o | 2- 1+ 3o 4+ | 22- | 15 | 18 | 7 | 15 | 6 | 5 | 15 | 32 | 113 | 14 | 0.8 |
| 13 | 3o 2o 2+ 2+ | 2- 1o 1o 2+ | 16- | 15 | 7 | 9 | 9 | 6 | 4 | 4 | 9 | 63 | 8 | 0.4 |
| 14 | 2o 3- 2o 2+ | 2o 2- 2+ 2- | 17- | 7 | 12 | 7 | 9 | 7 | 6 | 9 | 6 | 63 | 8 | 0.4 |
| 15 | 2o 3+ 3- 3o | 2o 1+ 2o 2+ | 19- | 7 | 18 | 12 | 15 | 7 | 5 | 7 | 9 | 80 | 10 | 0.6 |
| 16 | 3o 1o 3- 3- | 3+ 1+ 3- 3o | 20- | 15 | 4 | 12 | 12 | 18 | 5 | 12 | 15 | 93 | 12 | 0.7 |
| 17 | 3+ 4o 2o 2- | 2- 2- 1o 1+ | 17- | 18 | 27 | 7 | 6 | 6 | 6 | 4 | 5 | 79 | 10 | 0.6 |
| 18 | 2+ 1o 2o 1o | 2+ 4- 3o 4o | 19+ | 9 | 4 | 7 | 4 | 9 | 22 | 15 | 27 | 97 | 12 | 0.7 |
| 19 | 4o 3o 2+ 3- | 2o 1o 2o 2+ | 19+ | 27 | 15 | 9 | 12 | 7 | 4 | 7 | 9 | 90 | 11 | 0.6 |
| 20 | 1o 0+ 1- 1- | 1o 1+ 1o 1+ | 7+ | 4 | 2 | 3 | 3 | 4 | 5 | 4 | 5 | 30 | 4 | 0.1 |
| 21 | 1+ 1+ 2o 3o | 4- 4+ 4o 4+ | 24o | 5 | 5 | 7 | 15 | 22 | 32 | 27 | 32 | 145 | 18 | 1.0 |
| 22 | 4+ 2+ 2o 2+ | 1+ 2o 4o 4- | 22o | 32 | 9 | 7 | 9 | 5 | 7 | 27 | 22 | 118 | 15 | 0.8 |
| 23 | 2- 2- 2o 2o | 2o 2- 1- 0+ | 12o | 6 | 6 | 7 | 7 | 7 | 6 | 3 | 2 | 44 | 6 | 0.2 |
| 24 | 1- 0+ 3- 1o | 0+ 1o 2- 1+ | 9o | 3 | 2 | 12 | 4 | 2 | 4 | 6 | 5 | 38 | 5 | 0.2 |
| 25 | 0+ 0o 1- 1- | 1+ 4- 1+ 3- | 11- | 2 | 0 | 3 | 3 | 5 | 22 | 5 | 12 | 52 | 6 | 0.3 |
| 26 | 3- 3- 3o 3+ | 3- 3+ 3- 1o | 21+ | 12 | 12 | 15 | 18 | 12 | 18 | 12 | 4 | 103 | 13 | 0.7 |
| 27 | 3o 4- 3+ 5- | 4+ 5- 3+ 4- | 31- | 15 | 22 | 18 | 39 | 32 | 39 | 18 | 22 | 205 | 26 | 1.2 |
| 28 | 4+ 3+ 3o 2+ | 2- 1o 1+ 1- | 18- | 32 | 18 | 15 | 9 | 6 | 4 | 5 | 3 | 92 | 12 | 0.7 |
| 29 | 1- 1+ 3- 2o | 0+ 1- 1+ 1o | 10o | 3 | 5 | 12 | 7 | 2 | 3 | 5 | 4 | 41 | 5 | 0.2 |
| 30 | 1- 1o 1- 1o | 2- 1+ 2- 0+ | 8+ | 3 | 4 | 3 | 4 | 6 | 5 | 6 | 2 | 33 | 4 | 0.1 |
| 31 | 1- 2- 1o 1o | 1+ 1- 1o 1- | 8o | 3 | 6 | 4 | 4 | 5 | 3 | 4 | 3 | 32 | 4 | 0.1 |

| | Kp | Sum | Apr 1987 ap | | | | | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3- 4- 3+ 2o | 2- 2- 2o 1o | 18o | 12 | 22 | 18 | 7 | 6 | 6 | 7 | 4 | 82 | 10 | 0.6 |
| 2 | 1- 2o 1+ 2- | 1o 1+ 0+ 0+ | 9- | 3 | 7 | 5 | 6 | 4 | 5 | 2 | 2 | 34 | 4 | 0.1 |
| 3 | 0o 0o 0+ 0+ | 0+ 0+ 1- 0+ | 2+ | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 2 | 13 | 2 | 0.0 |
| 4 | 1- 4- 2o 4+ | 5- 3+ 1+ 1+ | 21+ | 3 | 22 | 7 | 32 | 39 | 18 | 5 | 5 | 131 | 16 | 0.9 |
| 5 | 3o 3+ 2o 1+ | 3- 3+ 3- 3- | 21o | 15 | 18 | 7 | 5 | 12 | 18 | 12 | 12 | 99 | 12 | 0.7 |
| 6 | 2- 3- 1- 2- | 3- 2+ 1o 2- | 14+ | 6 | 12 | 3 | 6 | 12 | 9 | 4 | 6 | 58 | 7 | 0.4 |
| 7 | 3+ 4- 4- 2o | 3- 3o 1+ 1- | 20+ | 18 | 22 | 22 | 7 | 12 | 15 | 5 | 3 | 104 | 13 | 0.7 |
| 8 | 1+ 2o 3o 3- | 2+ 2+ 3+ 3o | 20o | 5 | 7 | 15 | 12 | 9 | 9 | 18 | 15 | 90 | 11 | 0.6 |
| 9 | 1+ 2- 1+ 2+ | 2+ 2o 3+ 2- | 16o | 5 | 6 | 5 | 9 | 9 | 7 | 18 | 6 | 65 | 8 | 0.4 |
| 10 | 4+ 4o 2- 2- | 1- 1- 1- 0o | 14- | 32 | 27 | 6 | 6 | 3 | 3 | 3 | 0 | 80 | 10 | 0.6 |
| 11 | 1- 2+ 2+ 2o | 3- 2- 1- 2- | 14o | 3 | 9 | 9 | 7 | 12 | 6 | 3 | 6 | 55 | 7 | 0.3 |
| 12 | 1o 2+ 1- 1- | 1+ 1o 0+ 2o | 9+ | 4 | 9 | 3 | 3 | 5 | 4 | 2 | 7 | 37 | 5 | 0.2 |
| 13 | 2o 1+ 2- 3- | 1- 4+ 3o 3+ | 19o | 7 | 5 | 6 | 12 | 3 | 32 | 15 | 18 | 98 | 12 | 0.7 |
| 14 | 0+ 1o 1o 2o | 3o 2+ 2- 1o | 12+ | 2 | 4 | 4 | 7 | 15 | 9 | 6 | 4 | 51 | 6 | 0.3 |
| 15 | 2o 1+ 1- 1o | 2o 2o 2o 1+ | 12+ | 7 | 5 | 3 | 4 | 7 | 7 | 7 | 5 | 45 | 6 | 0.3 |
| 16 | 1- 1+ 1+ 1o | 1+ 1o 0o 1+ | 8o | 3 | 5 | 5 | 4 | 5 | 4 | 0 | 5 | 31 | 4 | 0.1 |
| 17 | 2+ 1- 0+ 1- | 2- 2- 1+ 1- | 9+ | 9 | 3 | 2 | 3 | 6 | 6 | 5 | 3 | 37 | 5 | 0.2 |
| 18 | 1- 1- 1- 1+ | 1o 1o 1o 1o | 7+ | 3 | 3 | 3 | 5 | 4 | 4 | 4 | 4 | 30 | 4 | 0.1 |
| 19 | 2o 2+ 3+ 3- | 1+ 1o 2- 1+ | 16- | 7 | 9 | 18 | 12 | 5 | 4 | 6 | 5 | 66 | 8 | 0.4 |
| 20 | 1+ 4- 4- 4o | 2o 1+ 0+ 0+ | 17- | 5 | 22 | 22 | 27 | 7 | 5 | 2 | 2 | 92 | 12 | 0.7 |
| 21 | 0o 2o 2- 1o | 0+ 0+ 0o 0o | 5+ | 0 | 7 | 6 | 4 | 2 | 2 | 0 | 0 | 21 | 3 | 0.0 |
| 22 | 0o 2o 1o 1+ | 1+ 1o 1+ 2- | 10- | 0 | 7 | 4 | 5 | 5 | 4 | 5 | 6 | 36 | 4 | 0.2 |
| 23 | 1- 2- 1- 1- | 1- 1- 1- 1o | 7- | 3 | 6 | 3 | 3 | 3 | 3 | 3 | 4 | 28 | 4 | 0.1 |
| 24 | 2+ 2+ 2+ 2+ | 3+ 1+ 2+ 2- | 18o | 9 | 9 | 9 | 9 | 18 | 5 | 9 | 6 | 74 | 9 | 0.5 |
| 25 | 1- 1+ 1+ 1o | 1+ 1+ 1o 1+ | 9+ | 3 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 36 | 4 | 0.2 |
| 26 | 1+ 1+ 0+ 1o | 2o 1o 1o 1- | 9- | 5 | 5 | 2 | 4 | 7 | 4 | 4 | 3 | 34 | 4 | 0.1 |
| 27 | 1o 1+ 3o 3- | 2- 3o 2o 2- | 16+ | 4 | 5 | 15 | 12 | 6 | 15 | 7 | 6 | 70 | 9 | 0.5 |
| 28 | 2- 0o 0o 0+ | 0+ 0o 0+ 1o | 4- | 6 | 0 | 0 | 2 | 2 | 0 | 2 | 4 | 16 | 2 | 0.0 |
| 29 | 1+ 1- 1- 1o | 0+ 1o 2+ 1+ | 9- | 5 | 3 | 3 | 4 | 2 | 4 | 9 | 5 | 35 | 4 | 0.2 |
| 30 | 1- 1- 1- 1- | 1- 1+ 1+ 2- | 8- | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 6 | 31 | 4 | 0.1 |

# Kp INDICES 1987 (continued)

| | Kp | | | | | | | | Sum | May 1987 | | | | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1- | 0+ | 1+ | 3o | 2- | 2o | 2+ | 3- | 14o | 3 | 2 | 5 | 15 | 6 | 7 | 9 | 12 | 59 | 7 | 0.4 |
| 2 | 2- | 1o | 2o | 2- | 1o | 2- | 2- | 1+ | 12o | 6 | 4 | 7 | 6 | 4 | 6 | 6 | 5 | 44 | 6 | 0.2 |
| 3 | 1- | 1o | 3- | 2+ | 2+ | 1+ | 1+ | 0+ | 12o | 3 | 4 | 12 | 9 | 9 | 5 | 5 | 2 | 49 | 6 | 0.3 |
| 4 | 1o | 2- | 3- | 1+ | 1+ | 1+ | 1- | 1- | 11- | 4 | 6 | 12 | 5 | 5 | 5 | 3 | 3 | 43 | 5 | 0.2 |
| 5 | 0+ | 0+ | 1- | 2- | 1+ | 2o | 2- | 1- | 9- | 2 | 2 | 3 | 6 | 5 | 7 | 6 | 3 | 34 | 4 | 0.1 |
| 6 | 0+ | 0+ | 0o | 0+ | 1+ | 2- | 3- | 3- | 9+ | 2 | 2 | 0 | 2 | 5 | 6 | 12 | 12 | 41 | 5 | 0.2 |
| 7 | 3- | 3+ | 2o | 2o | 1+ | 1+ | 1- | 1+ | 15- | 12 | 18 | 7 | 7 | 5 | 5 | 3 | 5 | 62 | 8 | 0.4 |
| 8 | 1o | 2o | 1- | 1o | 1- | 1o | 0+ | 1+ | 8o | 4 | 7 | 3 | 4 | 3 | 4 | 2 | 5 | 32 | 4 | 0.1 |
| 9 | 1- | 2- | 1+ | 2- | 1+ | 1o | 1- | 1o | 9+ | 3 | 6 | 5 | 6 | 5 | 4 | 3 | 4 | 36 | 4 | 0.2 |
| 10 | 1o | 1+ | 2o | 4- | 4- | 2+ | 2- | 1o | 17- | 4 | 5 | 7 | 22 | 22 | 9 | 6 | 4 | 79 | 10 | 0.6 |
| 11 | 2- | 1o | 1o | 1+ | 1- | 1o | 2o | 3- | 11+ | 6 | 4 | 4 | 5 | 3 | 4 | 7 | 12 | 45 | 6 | 0.3 |
| 12 | 1- | 1- | 0o | 0o | 0+ | 0+ | 1- | 1+ | 4o | 3 | 3 | 0 | 0 | 2 | 2 | 3 | 5 | 18 | 2 | 0.0 |
| 13 | 1- | 1o | 2o | 1o | 1+ | 2o | 2o | 3o | 13o | 3 | 4 | 7 | 4 | 5 | 7 | 7 | 15 | 52 | 6 | 0.3 |
| 14 | 3o | 2- | 2o | 2o | 3o | 2o | 2- | 2+ | 18- | 15 | 6 | 7 | 7 | 15 | 7 | 6 | 9 | 72 | 9 | 0.5 |
| 15 | 0+ | 1o | 1+ | 1+ | 1+ | 2- | 1- | 1- | 8+ | 2 | 4 | 5 | 5 | 5 | 6 | 3 | 3 | 33 | 4 | 0.1 |
| 16 | 1- | 2- | 1o | 1o | 1o | 1o | 2- | 1- | 9- | 3 | 6 | 4 | 4 | 4 | 4 | 6 | 3 | 34 | 4 | 0.1 |
| 17 | 1o | 1- | 0+ | 1- | 1o | 1o | 1+ | 1+ | 7+ | 4 | 3 | 2 | 3 | 4 | 4 | 5 | 5 | 30 | 4 | 0.1 |
| 18 | 1- | 0+ | 1- | 0+ | 0+ | 1- | 1- | 0+ | 4o | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 20 | 2 | 0.0 |
| 19 | 0+ | 0+ | 0+ | 0+ | 0+ | 1o | 0+ | 1o | 4o | 2 | 2 | 2 | 2 | 2 | 4 | 2 | 4 | 20 | 2 | 0.0 |
| 20 | 2- | 1- | 1o | 1- | 1o | 1o | 1- | 2- | 8+ | 6 | 3 | 4 | 3 | 4 | 4 | 3 | 6 | 33 | 4 | 0.1 |
| 21 | 1+ | 1o | 0+ | 0+ | 0+ | 1- | 1- | 0+ | 5o | 5 | 4 | 2 | 2 | 2 | 3 | 3 | 2 | 23 | 3 | 0.1 |
| 22 | 1- | 1+ | 1o | 1+ | 2+ | 3o | 2- | 2o | 13+ | 3 | 5 | 4 | 5 | 9 | 15 | 6 | 7 | 54 | 7 | 0.3 |
| 23 | 2- | 2- | 2o | 2- | 1+ | 2o | 3- | 3o | 16o | 6 | 6 | 7 | 6 | 5 | 7 | 12 | 15 | 64 | 8 | 0.4 |
| 24 | 2o | 3+ | 2+ | 3- | 3- | 4o | 4o | 5o | 26o | 7 | 18 | 9 | 12 | 12 | 27 | 27 | 48 | 160 | 20 | 1.0 |
| 25 | 3o | 6- | 4+ | 3o | 4+ | 3- | 4- | 1o | 28- | 15 | 67 | 32 | 15 | 32 | 12 | 22 | 4 | 199 | 25 | 1.2 |
| 26 | 1- | 1+ | 2o | 2o | 2o | 2+ | 4o | 2o | 16+ | 3 | 5 | 7 | 7 | 7 | 9 | 27 | 7 | 72 | 9 | 0.5 |
| 27 | 3- | 3o | 4- | 4- | 2+ | 2o | 3o | 3- | 23o | 12 | 15 | 22 | 22 | 9 | 7 | 15 | 12 | 114 | 14 | 0.8 |
| 28 | 2o | 2- | 2- | 2o | 2- | 1o | 3o | 4+ | 17+ | 7 | 6 | 6 | 7 | 6 | 4 | 15 | 32 | 83 | 10 | 0.6 |
| 29 | 3+ | 5- | 5o | 5- | 4o | 2- | 1+ | 0+ | 25o | 18 | 39 | 48 | 39 | 27 | 6 | 5 | 2 | 184 | 23 | 1.1 |
| 30 | 0+ | 1- | 1+ | 3- | 3+ | 2+ | 3o | 2- | 15+ | 2 | 3 | 5 | 12 | 18 | 9 | 15 | 6 | 70 | 9 | 0.5 |
| 31 | 2- | 2- | 2+ | 3- | 2+ | 3- | 4- | 3- | 20- | 6 | 6 | 9 | 12 | 9 | 12 | 22 | 12 | 88 | 11 | 0.6 |

| | Kp | | | | | | | | Sum | Jun 1987 | | | | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3- | 1+ | 1- | 2- | 3- | 2- | 2o | 2+ | 15o | 12 | 5 | 3 | 6 | 12 | 6 | 7 | 9 | 60 | 8 | 0.4 |
| 2 | 3+ | 3o | 2+ | 1+ | 1o | 1o | 1o | 1o | 14o | 18 | 15 | 9 | 5 | 4 | 4 | 4 | 4 | 63 | 8 | 0.4 |
| 3 | 0+ | 1o | 1- | 1+ | 1+ | 1o | 1+ | 2o | 9o | 2 | 4 | 3 | 5 | 5 | 4 | 5 | 7 | 35 | 4 | 0.2 |
| 4 | 2o | 1+ | 1+ | 2o | 2o | 1+ | 1+ | 2- | 13o | 7 | 5 | 5 | 7 | 7 | 5 | 5 | 6 | 47 | 6 | 0.3 |
| 5 | 1+ | 2- | 1+ | 1o | 2+ | 3- | 2+ | 2+ | 15o | 5 | 6 | 5 | 4 | 9 | 12 | 9 | 9 | 59 | 7 | 0.4 |
| 6 | 1o | 2o | 5o | 5- | 4+ | 3+ | 4o | 4o | 28+ | 4 | 7 | 48 | 39 | 32 | 18 | 27 | 27 | 202 | 25 | 1.2 |
| 7 | 3o | 1o | 1o | 3- | 2+ | 2+ | 3- | 2o | 17o | 15 | 4 | 4 | 12 | 9 | 9 | 12 | 7 | 72 | 9 | 0.5 |
| 8 | 1+ | 1o | 1+ | 1- | 1- | 1- | 0+ | 1o | 7o | 5 | 4 | 5 | 3 | 3 | 3 | 2 | 4 | 29 | 4 | 0.1 |
| 9 | 1- | 0+ | 1- | 1- | 0+ | 1o | 1- | 2o | 6+ | 3 | 2 | 3 | 3 | 2 | 4 | 3 | 7 | 27 | 3 | 0.1 |
| 10 | 2- | 1o | 0+ | 1o | 2- | 1+ | 1- | 1o | 9- | 6 | 4 | 2 | 4 | 6 | 5 | 3 | 4 | 34 | 4 | 0.1 |
| 11 | 2- | 1+ | 2- | 3o | 2o | 2o | 2- | 2- | 15o | 6 | 5 | 6 | 15 | 7 | 7 | 6 | 6 | 58 | 7 | 0.4 |
| 12 | 2o | 3- | 2o | 3- | 3+ | 3+ | 3o | 3- | 22- | 7 | 12 | 7 | 12 | 18 | 18 | 15 | 12 | 101 | 13 | 0.7 |
| 13 | 2+ | 2+ | 2- | 2- | 2- | 1o | 2- | 1+ | 14- | 9 | 9 | 6 | 6 | 6 | 4 | 6 | 5 | 51 | 6 | 0.3 |
| 14 | 2- | 1+ | 3- | 2- | 1+ | 1- | 1- | 2- | 12- | 6 | 5 | 12 | 6 | 5 | 3 | 3 | 6 | 46 | 6 | 0.3 |
| 15 | 1- | 0+ | 0+ | 1- | 0+ | 2+ | 2o | 1+ | 8o | 3 | 2 | 2 | 3 | 2 | 9 | 7 | 5 | 33 | 4 | 0.1 |
| 16 | 2- | 1o | 2+ | 1o | 1+ | 2o | 3+ | 3- | 15+ | 6 | 4 | 9 | 4 | 5 | 7 | 18 | 12 | 65 | 8 | 0.4 |
| 17 | 3- | 2- | 1- | 1o | 2- | 1- | 1- | 2o | 11o | 12 | 6 | 3 | 4 | 6 | 3 | 3 | 7 | 44 | 6 | 0.2 |
| 18 | 2o | 2- | 2- | 2- | 1+ | 2- | 1+ | 2- | 13o | 7 | 6 | 6 | 6 | 5 | 6 | 5 | 6 | 47 | 6 | 0.3 |
| 19 | 3o | 3o | 4+ | 4o | 3o | 1+ | 2- | 4- | 24o | 15 | 15 | 32 | 27 | 15 | 5 | 6 | 22 | 137 | 17 | 0.9 |
| 20 | 2o | 1+ | 1o | 2- | 2o | 2- | 3+ | 3o | 16o | 7 | 5 | 4 | 6 | 7 | 6 | 18 | 15 | 68 | 8 | 0.5 |
| 21 | 3- | 2- | 1o | 1o | 0+ | 1o | 2o | 2+ | 12o | 12 | 6 | 4 | 4 | 2 | 4 | 7 | 9 | 48 | 6 | 0.3 |
| 22 | 1o | 1- | 1o | 1o | 1- | 1o | 1+ | 1o | 8- | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 4 | 31 | 4 | 0.1 |
| 23 | 1- | 1+ | 1- | 0+ | 1- | 1- | 1o | 1- | 6o | 3 | 5 | 3 | 2 | 3 | 3 | 4 | 3 | 26 | 3 | 0.1 |
| 24 | 0+ | 1o | 2o | 1o | 1- | 2o | 3- | 3o | 13- | 2 | 4 | 7 | 4 | 3 | 7 | 12 | 15 | 54 | 7 | 0.3 |
| 25 | 1- | 1o | 1- | 1+ | 1- | 1o | 3+ | 3+ | 12o | 3 | 4 | 3 | 5 | 3 | 4 | 18 | 18 | 58 | 7 | 0.4 |
| 26 | 4- | 3- | 1o | 1- | 2- | 1+ | 2+ | 3- | 16o | 22 | 12 | 4 | 3 | 6 | 5 | 9 | 12 | 73 | 9 | 0.5 |
| 27 | 2- | 1+ | 2- | 2+ | 1+ | 1o | 0+ | 0+ | 10o | 6 | 5 | 6 | 9 | 5 | 4 | 2 | 2 | 39 | 5 | 0.2 |
| 28 | 1- | 2- | 1+ | 1- | 1- | 0+ | 1o | 2o | 8+ | 3 | 6 | 5 | 3 | 3 | 2 | 4 | 7 | 33 | 4 | 0.1 |
| 29 | 1o | 2- | 1o | 1+ | 1- | 1+ | 1+ | 2o | 10+ | 4 | 6 | 4 | 5 | 3 | 5 | 5 | 7 | 39 | 5 | 0.2 |
| 30 | 1+ | 1o | 1- | 1- | 0+ | 1- | 0+ | 0+ | 5+ | 5 | 4 | 3 | 3 | 2 | 3 | 2 | 2 | 24 | 3 | 0.1 |

# Kp INDICES 1987 (continued)

| | Kp | | | | | | | | Sum | Jul 1987 | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0+ | 1- | 0o | 0+ | 1- | 1o | 1- | 1- | 4+ | 2 | 3 | 0 | 2 | 3 | 4 | 3 | 3 | 20 | 2 | 0.0 |
| 2 | 1- | 1o | 0+ | 0+ | 0+ | 1- | 2- | 1+ | 6+ | 3 | 4 | 2 | 2 | 2 | 3 | 6 | 5 | 27 | 3 | 0.1 |
| 3 | 1o | 1o | 1- | 2- | 1o | 1o | 4o | 3+ | 14- | 4 | 4 | 3 | 6 | 4 | 4 | 27 | 18 | 70 | 9 | 0.5 |
| 4 | 4- | 2+ | 2o | 1o | 1- | 1+ | 2+ | 1+ | 15- | 22 | 9 | 7 | 4 | 3 | 5 | 9 | 5 | 64 | 8 | 0.4 |
| 5 | 2o | 2- | 2o | 1+ | 2- | 1o | 2- | 2- | 13o | 7 | 6 | 7 | 5 | 6 | 4 | 6 | 6 | 47 | 6 | 0.3 |
| 6 | 1+ | 2- | 1o | 1o | 1+ | 1+ | 1+ | 2- | 11- | 5 | 6 | 4 | 4 | 5 | 5 | 5 | 6 | 40 | 5 | 0.2 |
| 7 | 1- | 1- | 1- | 1- | 1o | 1- | 2o | 1- | 7o | 3 | 3 | 3 | 3 | 4 | 3 | 7 | 3 | 29 | 4 | 0.1 |
| 8 | 2o | 3- | 2+ | 3o | 3- | 2o | 2- | 2+ | 19- | 7 | 12 | 9 | 15 | 12 | 7 | 6 | 9 | 77 | 10 | 0.5 |
| 9 | 2- | 3- | 3- | 2- | 1+ | 2+ | 2o | 3o | 17+ | 6 | 12 | 12 | 6 | 5 | 9 | 7 | 15 | 72 | 9 | 0.5 |
| 10 | 3+ | 3- | 2o | 3- | 3+ | 2o | 2o | 1o | 19o | 18 | 12 | 7 | 12 | 18 | 7 | 7 | 4 | 85 | 11 | 0.6 |
| 11 | 2o | 2+ | 2+ | 1o | 1+ | 1+ | 2o | 2o | 14+ | 7 | 9 | 9 | 4 | 5 | 5 | 7 | 7 | 53 | 7 | 0.3 |
| 12 | 1- | 2o | 2+ | 2+ | 2+ | 2- | 2o | 2+ | 16- | 3 | 7 | 9 | 9 | 9 | 6 | 7 | 9 | 59 | 7 | 0.4 |
| 13 | 1+ | 1- | 1- | 1- | 1o | 0+ | 1o | 2+ | 8o | 5 | 3 | 3 | 3 | 4 | 2 | 4 | 9 | 33 | 4 | 0.1 |
| 14 | 2o | 2o | 2- | 1+ | 0+ | 1o | 2- | 2- | 12- | 7 | 7 | 6 | 5 | 2 | 4 | 6 | 6 | 43 | 5 | 0.2 |
| 15 | 2- | 2- | 3+ | 4- | 5- | 4o | 4+ | 5- | 28o | 6 | 6 | 18 | 22 | 39 | 27 | 32 | 39 | 189 | 24 | 1.1 |
| 16 | 4o | 3+ | 3+ | 4- | 2- | 4o | 3o | 4o | 27o | 27 | 18 | 18 | 22 | 6 | 27 | 15 | 27 | 160 | 20 | 1.0 |
| 17 | 3- | 4- | 3- | 3o | 4- | 2- | 3- | 3o | 23o | 12 | 22 | 12 | 15 | 22 | 6 | 12 | 15 | 116 | 14 | 0.8 |
| 18 | 3o | 3- | 2o | 2+ | 2+ | 2o | 3o | 2+ | 20- | 15 | 12 | 7 | 9 | 9 | 7 | 15 | 9 | 83 | 10 | 0.6 |
| 19 | 2+ | 2- | 1- | 2o | 2+ | 2o | 3- | 3- | 16+ | 9 | 6 | 3 | 7 | 9 | 7 | 12 | 12 | 65 | 8 | 0.4 |
| 20 | 2- | 3- | 1+ | 1o | 2o | 2o | 3- | 4- | 17o | 6 | 12 | 5 | 4 | 7 | 7 | 12 | 22 | 75 | 9 | 0.5 |
| 21 | 2- | 2- | 2+ | 1+ | 1+ | 2- | 1+ | 2- | 13o | 6 | 6 | 9 | 5 | 5 | 6 | 5 | 6 | 48 | 6 | 0.3 |
| 22 | 2o | 2+ | 3- | 2o | 1o | 1+ | 2+ | 2o | 16- | 7 | 9 | 12 | 7 | 4 | 5 | 9 | 7 | 60 | 8 | 0.4 |
| 23 | 1o | 1+ | 1- | 1- | 1+ | 1+ | 2o | 3- | 11o | 4 | 5 | 3 | 3 | 5 | 5 | 7 | 12 | 44 | 6 | 0.2 |
| 24 | 2- | 1+ | 1o | 1- | 2- | 4o | 4o | 3o | 17+ | 6 | 5 | 4 | 3 | 6 | 27 | 27 | 15 | 93 | 12 | 0.7 |
| 25 | 3+ | 3- | 3+ | 4+ | 4- | 3- | 3- | 2+ | 25o | 18 | 12 | 18 | 32 | 22 | 12 | 12 | 9 | 135 | 17 | 0.9 |
| 26 | 1- | 1- | 2- | 1o | 1- | 1- | 1- | 1- | 7- | 3 | 3 | 6 | 4 | 3 | 3 | 3 | 3 | 28 | 4 | 0.1 |
| 27 | 2o | 2- | 2- | 1o | 2- | 1o | 1o | 1- | 11- | 7 | 6 | 6 | 4 | 6 | 4 | 4 | 3 | 40 | 5 | 0.2 |
| 28 | 1+ | 2- | 2+ | 4- | 5o | 4+ | 4+ | 5+ | 28o | 5 | 6 | 9 | 22 | 48 | 32 | 32 | 56 | 210 | 26 | 1.2 |
| 29 | 7- | 7o | 5+ | 5o | 5o | 3- | 1+ | 1o | 34o | 111 | 132 | 56 | 48 | 48 | 12 | 5 | 4 | 416 | 52 | 1.6 |
| 30 | 3+ | 1+ | 1+ | 1+ | 2+ | 1+ | 2+ | 3o | 16+ | 18 | 5 | 5 | 5 | 9 | 5 | 9 | 15 | 71 | 9 | 0.5 |
| 31 | 3+ | 5o | 3o | 2- | 2o | 1o | 2o | 1+ | 19+ | 18 | 48 | 15 | 6 | 7 | 4 | 7 | 5 | 110 | 14 | 0.8 |

| | Kp | | | | | | | | Sum | Aug 1987 | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3o | 4o | 2o | 2- | 2o | 2- | 1+ | 1+ | 17o | 15 | 27 | 7 | 6 | 7 | 6 | 5 | 5 | 78 | 10 | 0.5 |
| 2 | 2+ | 1+ | 2- | 0+ | 1+ | 1o | 1o | 1o | 10o | 9 | 5 | 6 | 2 | 5 | 4 | 4 | 4 | 39 | 5 | 0.2 |
| 3 | 1o | 1+ | 2o | 2o | 3o | 5- | 3o | 1+ | 18+ | 4 | 5 | 7 | 7 | 15 | 39 | 15 | 5 | 97 | 12 | 0.7 |
| 4 | 1+ | 2o | 1+ | 1+ | 1+ | 2o | 2+ | 3- | 14+ | 5 | 7 | 5 | 5 | 5 | 7 | 9 | 12 | 55 | 7 | 0.3 |
| 5 | 3+ | 3+ | 3+ | 3o | 2+ | 2+ | 2+ | 2- | 22- | 18 | 18 | 18 | 15 | 9 | 9 | 9 | 6 | 102 | 13 | 0.7 |
| 6 | 1o | 2o | 2+ | 2o | 2o | 3o | 2o | 1o | 15+ | 4 | 7 | 9 | 7 | 7 | 15 | 7 | 4 | 60 | 8 | 0.4 |
| 7 | 2+ | 1o | 1- | 1o | 1o | 1o | 1o | 1- | 9- | 9 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 35 | 4 | 0.2 |
| 8 | 1+ | 2- | 2o | 2- | 2o | 2o | 3- | 4+ | 18- | 5 | 6 | 7 | 6 | 7 | 7 | 12 | 32 | 82 | 10 | 0.6 |
| 9 | 3o | 2+ | 3- | 1+ | 3- | 1+ | 2- | 1o | 16o | 15 | 9 | 12 | 5 | 12 | 5 | 6 | 4 | 68 | 8 | 0.5 |
| 10 | 1o | 1o | 1o | 1o | 1o | 1+ | 1+ | 1+ | 9o | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 35 | 4 | 0.2 |
| 11 | 2- | 1+ | 1- | 0+ | 2- | 2+ | 3o | 2+ | 13+ | 6 | 5 | 3 | 2 | 6 | 9 | 15 | 9 | 55 | 7 | 0.3 |
| 12 | 3+ | 3- | 2+ | 2o | 3o | 4- | 3+ | 4o | 24+ | 18 | 12 | 9 | 7 | 15 | 22 | 18 | 27 | 128 | 16 | 0.9 |
| 13 | 3+ | 3o | 6- | 4+ | 3- | 2+ | 3o | 3+ | 28- | 18 | 15 | 67 | 32 | 12 | 9 | 15 | 18 | 186 | 23 | 1.1 |
| 14 | 3+ | 4o | 2+ | 3- | 3- | 3- | 3+ | 3+ | 24+ | 18 | 27 | 9 | 12 | 12 | 12 | 18 | 18 | 126 | 16 | 0.9 |
| 15 | 2+ | 3o | 4o | 4- | 4- | 2+ | 3+ | 4+ | 27- | 9 | 15 | 27 | 22 | 22 | 9 | 18 | 32 | 154 | 19 | 1.0 |
| 16 | 3+ | 3+ | 3o | 3o | 2+ | 2- | 2+ | 2o | 21o | 18 | 18 | 15 | 15 | 9 | 6 | 9 | 7 | 97 | 12 | 0.7 |
| 17 | 2+ | 2+ | 2o | 2o | 3o | 4o | 2+ | 2o | 20o | 9 | 9 | 7 | 7 | 15 | 27 | 9 | 7 | 90 | 11 | 0.6 |
| 18 | 2- | 3- | 2- | 1+ | 1+ | 2- | 1+ | 2- | 13+ | 6 | 12 | 6 | 5 | 5 | 6 | 5 | 6 | 51 | 6 | 0.3 |
| 19 | 1+ | 3- | 3- | 1+ | 3- | 2+ | 1+ | 2+ | 17- | 5 | 12 | 12 | 5 | 12 | 9 | 5 | 9 | 69 | 9 | 0.5 |
| 20 | 2+ | 2o | 2o | 3- | 2+ | 2o | 2+ | 1+ | 17o | 9 | 7 | 7 | 12 | 9 | 7 | 9 | 5 | 65 | 8 | 0.4 |
| 21 | 3- | 1+ | 2- | 1o | 1- | 1+ | 1+ | 0+ | 10+ | 12 | 5 | 6 | 4 | 3 | 5 | 5 | 2 | 42 | 5 | 0.2 |
| 22 | 1o | 1o | 1o | 2+ | 1+ | 2+ | 3- | 2- | 13+ | 4 | 4 | 4 | 9 | 5 | 9 | 12 | 6 | 53 | 7 | 0.3 |
| 23 | 2o | 2o | 3- | 2- | 3- | 3o | 3- | 3- | 19+ | 7 | 7 | 12 | 6 | 12 | 15 | 12 | 12 | 83 | 10 | 0.6 |
| 24 | 2o | 2o | 1- | 4- | 4- | 2+ | 2+ | 2+ | 19o | 7 | 7 | 3 | 22 | 22 | 9 | 9 | 9 | 88 | 11 | 0.6 |
| 25 | 3- | 2- | 4- | 5- | 6o | 5+ | 5+ | 5- | 34o | 12 | 6 | 22 | 39 | 80 | 56 | 56 | 39 | 310 | 39 | 1.4 |
| 26 | 6- | 6o | 5- | 5- | 4+ | 4- | 4o | 3o | 36o | 67 | 80 | 39 | 39 | 32 | 22 | 27 | 15 | 321 | 40 | 1.5 |
| 27 | 3o | 3- | 3+ | 4- | 4+ | 5+ | 4o | 2- | 28o | 15 | 12 | 18 | 22 | 32 | 56 | 27 | 6 | 188 | 24 | 1.1 |
| 28 | 2+ | 3- | 1o | 2- | 3- | 3- | 4o | 5- | 22- | 9 | 12 | 4 | 6 | 12 | 12 | 27 | 39 | 121 | 15 | 0.9 |
| 29 | 4- | 1o | 1+ | 3o | 1+ | 3+ | 3+ | 3- | 20- | 22 | 4 | 5 | 15 | 5 | 18 | 18 | 12 | 99 | 12 | 0.7 |
| 30 | 2+ | 3- | 5- | 2o | 2- | 3o | 3o | 3- | 22o | 9 | 12 | 39 | 7 | 6 | 15 | 15 | 12 | 115 | 14 | 0.8 |
| 31 | 3+ | 4- | 6- | 3- | 6- | 5+ | 3+ | 3o | 33- | 18 | 22 | 67 | 12 | 67 | 56 | 18 | 15 | 275 | 34 | 1.4 |

# Kp INDICES 1987 (continued)

| | Kp | | | | | | | | Sum | Sep 1987 | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5- | 5+ | 4+ | 3+ | 5- | 4+ | 3+ | 5- | 35- | 39 | 56 | 32 | 18 | 39 | 32 | 18 | 39 | 273 | 34 | 1.3 |
| 2 | 4- | 4- | 3o | 2o | 2o | 2+ | 2+ | 1+ | 20+ | 22 | 22 | 15 | 7 | 7 | 9 | 9 | 5 | 96 | 12 | 0.7 |
| 3 | 0+ | 1+ | 2o | 1+ | 1o | 1- | 0o | 1- | 7+ | 2 | 5 | 7 | 5 | 4 | 3 | 0 | 3 | 29 | 4 | 0.1 |
| 4 | 2- | 2+ | 1- | 1+ | 2o | 2o | 2- | 2+ | 14o | 6 | 9 | 3 | 5 | 7 | 7 | 6 | 9 | 52 | 6 | 0.3 |
| 5 | 2o | 2o | 2o | 2+ | 2- | 1o | 1+ | 2- | 14o | 7 | 7 | 7 | 9 | 6 | 4 | 5 | 6 | 51 | 6 | 0.3 |
| 6 | 2+ | 2- | 2o | 3o | 2o | 2+ | 3o | 2- | 18o | 9 | 6 | 7 | 15 | 7 | 9 | 15 | 6 | 74 | 9 | 0.5 |
| 7 | 1- | 2- | 2+ | 3- | 4- | 3- | 1o | 3+ | 18o | 3 | 6 | 9 | 12 | 22 | 12 | 4 | 18 | 86 | 11 | 0.6 |
| 8 | 3+ | 2+ | 2+ | 3- | 2+ | 2+ | 1+ | 2o | 19- | 18 | 9 | 9 | 12 | 9 | 9 | 5 | 7 | 78 | 10 | 0.5 |
| 9 | 2o | 2+ | 4o | 3- | 2- | 1o | 2- | 2- | 17o | 7 | 9 | 27 | 12 | 6 | 4 | 6 | 6 | 77 | 10 | 0.5 |
| 10 | 2o | 1o | 1o | 4- | 6+ | 6o | 4o | 6- | 30- | 7 | 4 | 4 | 22 | 94 | 80 | 27 | 67 | 305 | 38 | 1.4 |
| 11 | 5+ | 4o | 4+ | 5+ | 4- | 5- | 5o | 5- | 37o | 56 | 27 | 32 | 56 | 22 | 39 | 48 | 39 | 319 | 40 | 1.4 |
| 12 | 2+ | 4- | 4o | 3o | 3+ | 4- | 4+ | 4o | 28+ | 9 | 22 | 27 | 15 | 18 | 22 | 32 | 27 | 172 | 22 | 1.1 |
| 13 | 4o | 4- | 2o | 2+ | 4o | 5o | 2o | 5- | 28- | 27 | 22 | 7 | 9 | 27 | 48 | 7 | 39 | 186 | 23 | 1.1 |
| 14 | 5o | 5- | 4- | 4- | 3+ | 3- | 4+ | 3o | 30+ | 48 | 39 | 22 | 22 | 18 | 12 | 32 | 15 | 208 | 26 | 1.2 |
| 15 | 4o | 4- | 4+ | 4- | 3+ | 4+ | 4+ | 5o | 33- | 27 | 22 | 32 | 22 | 18 | 32 | 32 | 48 | 233 | 29 | 1.3 |
| 16 | 5- | 3- | 3+ | 4- | 3o | 3o | 3o | 3o | 26+ | 39 | 12 | 18 | 22 | 15 | 15 | 15 | 15 | 151 | 19 | 1.0 |
| 17 | 2+ | 4- | 3o | 3o | 3o | 3+ | 4- | 4- | 26- | 9 | 22 | 15 | 15 | 15 | 18 | 22 | 22 | 138 | 17 | 0.9 |
| 18 | 2+ | 2o | 2+ | 2+ | 1+ | 2o | 2- | 2o | 16o | 9 | 7 | 9 | 9 | 5 | 7 | 6 | 7 | 59 | 7 | 0.4 |
| 19 | 2- | 0+ | 1- | 2o | 1o | 1- | 0+ | 0o | 7- | 6 | 2 | 3 | 7 | 4 | 3 | 2 | 0 | 27 | 3 | 0.1 |
| 20 | 1o | 2o | 1- | 1+ | 2+ | 4- | 4+ | 2+ | 18- | 4 | 7 | 3 | 5 | 9 | 22 | 32 | 9 | 91 | 11 | 0.7 |
| 21 | 2+ | 3o | 2+ | 3- | 4- | 2- | 1+ | 1+ | 18+ | 9 | 15 | 9 | 12 | 22 | 6 | 5 | 5 | 83 | 10 | 0.6 |
| 22 | 4- | 4- | 3- | 2o | 2- | 5- | 4+ | 6+ | 29o | 22 | 22 | 12 | 7 | 6 | 39 | 32 | 94 | 234 | 29 | 1.3 |
| 23 | 6- | 4- | 3+ | 2o | 2o | 2- | 1+ | 1- | 20+ | 67 | 22 | 18 | 7 | 7 | 6 | 5 | 3 | 135 | 17 | 0.9 |
| 24 | 4- | 4+ | 3- | 2+ | 2o | 2o | 3- | 2+ | 22o | 22 | 32 | 12 | 9 | 7 | 7 | 12 | 9 | 110 | 14 | 0.8 |
| 25 | 3- | 4- | 4+ | 5- | 5+ | 6o | 5+ | 6- | 38- | 12 | 22 | 32 | 39 | 56 | 80 | 56 | 67 | 364 | 46 | 1.5 |
| 26 | 3o | 5- | 4+ | 4- | 3o | 3- | 3+ | 2- | 26+ | 15 | 39 | 32 | 22 | 15 | 12 | 18 | 6 | 159 | 20 | 1.0 |
| 27 | 3o | 2o | 2- | 3- | 2+ | 2o | 3+ | 3- | 20- | 15 | 7 | 6 | 12 | 9 | 7 | 18 | 12 | 86 | 11 | 0.6 |
| 28 | 5o | 3- | 2+ | 4+ | 4o | 3- | 3+ | 3+ | 28- | 48 | 12 | 9 | 32 | 27 | 12 | 18 | 18 | 176 | 22 | 1.1 |
| 29 | 4- | 4- | 3- | 3o | 5+ | 5+ | 4+ | 4- | 32- | 22 | 22 | 12 | 15 | 56 | 56 | 32 | 22 | 237 | 30 | 1.3 |
| 30 | 5o | 6o | 5o | 4+ | 4o | 6- | 4o | 3- | 37- | 48 | 80 | 48 | 32 | 27 | 67 | 27 | 12 | 341 | 43 | 1.5 |

| | Kp | | | | | | | | Sum | Oct 1987 | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4- | 2+ | 3o | 2+ | 2o | 3o | 3o | 2+ | 22- | 22 | 9 | 15 | 9 | 7 | 15 | 15 | 9 | 101 | 13 | 0.7 |
| 2 | 3o | 2o | 2+ | 4- | 2o | 1- | 1+ | 0+ | 15+ | 15 | 7 | 9 | 22 | 7 | 3 | 5 | 2 | 70 | 9 | 0.5 |
| 3 | 0+ | 2+ | 4+ | 5- | 6o | 5o | 5+ | 4- | 32- | 2 | 9 | 32 | 39 | 80 | 48 | 56 | 22 | 288 | 36 | 1.4 |
| 4 | 3o | 3o | 3- | 4- | 4o | 2+ | 1o | 1o | 21- | 15 | 15 | 12 | 22 | 27 | 9 | 4 | 4 | 108 | 14 | 0.8 |
| 5 | 1o | 2o | 1+ | 2+ | 2- | 1+ | 1o | 1+ | 12o | 4 | 7 | 5 | 9 | 6 | 5 | 4 | 5 | 45 | 6 | 0.3 |
| 6 | 1o | 1+ | 1+ | 1+ | 1- | 1o | 2o | 2o | 11- | 4 | 5 | 5 | 5 | 3 | 4 | 7 | 7 | 40 | 5 | 0.2 |
| 7 | 0+ | 1+ | 2- | 2+ | 4o | 2- | 1o | 1+ | 14- | 2 | 5 | 6 | 9 | 27 | 6 | 4 | 5 | 64 | 8 | 0.4 |
| 8 | 3o | 2o | 2o | 3o | 2o | 1+ | 2o | 1- | 16o | 15 | 7 | 7 | 15 | 7 | 5 | 7 | 3 | 66 | 8 | 0.4 |
| 9 | 0+ | 1- | 1- | 0+ | 0o | 0o | 2- | 2o | 6- | 2 | 3 | 3 | 2 | 0 | 0 | 6 | 7 | 23 | 3 | 0.1 |
| 10 | 3o | 3- | 1+ | 1- | 1o | 1+ | 2o | 1+ | 13+ | 15 | 12 | 5 | 3 | 4 | 5 | 7 | 5 | 56 | 7 | 0.4 |
| 11 | 3- | 3o | 4o | 3o | 4- | 6- | 5o | 4- | 31- | 12 | 15 | 27 | 15 | 22 | 67 | 48 | 22 | 228 | 28 | 1.2 |
| 12 | 2o | 2o | 1o | 1- | 3- | 3o | 2o | 2+ | 16- | 7 | 7 | 4 | 3 | 12 | 15 | 7 | 9 | 64 | 8 | 0.4 |
| 13 | 3o | 3o | 3o | 3o | 4o | 4+ | 5- | 4+ | 29+ | 15 | 15 | 15 | 15 | 27 | 32 | 39 | 32 | 190 | 24 | 1.1 |
| 14 | 4+ | 4o | 4+ | 4o | 4- | 6- | 4+ | 3- | 33o | 32 | 27 | 32 | 27 | 22 | 67 | 32 | 12 | 251 | 31 | 1.3 |
| 15 | 3o | 5- | 4+ | 5- | 4- | 4+ | 4- | 2+ | 31- | 15 | 39 | 32 | 39 | 22 | 32 | 22 | 9 | 210 | 26 | 1.2 |
| 16 | 2+ | 3+ | 4- | 2+ | 3- | 3+ | 2+ | 2- | 22- | 9 | 18 | 22 | 9 | 12 | 18 | 9 | 6 | 103 | 13 | 0.7 |
| 17 | 2+ | 1+ | 2o | 4o | 5- | 4- | 3+ | 3o | 24+ | 9 | 5 | 7 | 27 | 39 | 22 | 18 | 15 | 142 | 18 | 1.0 |
| 18 | 2o | 1+ | 1+ | 2o | 2- | 1+ | 1- | 0+ | 11- | 7 | 5 | 5 | 7 | 6 | 5 | 3 | 2 | 40 | 5 | 0.2 |
| 19 | 1+ | 1+ | 1- | 2o | 3- | 2+ | 1+ | 1+ | 13o | 5 | 5 | 3 | 7 | 12 | 9 | 5 | 5 | 51 | 6 | 0.3 |
| 20 | 1o | 1o | 1o | 1o | 1+ | 2o | 2+ | 4o | 14- | 4 | 4 | 4 | 4 | 5 | 7 | 9 | 27 | 64 | 8 | 0.4 |
| 21 | 3+ | 3o | 2- | 2+ | 2o | 3+ | 4o | 2o | 22- | 18 | 15 | 6 | 9 | 7 | 18 | 27 | 7 | 107 | 13 | 0.8 |
| 22 | 1o | 1+ | 1o | 1o | 1o | 1o | 2o | 2+ | 11- | 4 | 5 | 4 | 4 | 4 | 4 | 7 | 9 | 41 | 5 | 0.2 |
| 23 | 4- | 3+ | 2o | 2+ | 2o | 3+ | 1- | 1- | 18o | 22 | 18 | 7 | 9 | 7 | 18 | 3 | 3 | 87 | 11 | 0.6 |
| 24 | 2+ | 2+ | 2+ | 3+ | 2o | 2+ | 5+ | 5- | 25- | 9 | 9 | 9 | 18 | 7 | 9 | 56 | 39 | 156 | 20 | 1.0 |
| 25 | 5- | 5+ | 5o | 4+ | 4- | 2o | 2+ | 3o | 30+ | 39 | 56 | 48 | 32 | 22 | 7 | 9 | 15 | 228 | 28 | 1.2 |
| 26 | 1+ | 3- | 3o | 3+ | 3o | 3o | 1o | 2- | 19o | 5 | 12 | 15 | 18 | 15 | 15 | 4 | 6 | 90 | 11 | 0.6 |
| 27 | 4+ | 3+ | 5- | 4o | 4+ | 5- | 5- | 5+ | 35+ | 32 | 18 | 39 | 27 | 32 | 39 | 39 | 56 | 282 | 35 | 1.4 |
| 28 | 6- | 5o | 5o | 5+ | 4+ | 5o | 5- | 3+ | 38+ | 67 | 48 | 48 | 56 | 32 | 48 | 39 | 18 | 356 | 44 | 1.5 |
| 29 | 4o | 4- | 3+ | 3+ | 4- | 3o | 3o | 3o | 27o | 27 | 22 | 18 | 18 | 22 | 15 | 15 | 15 | 152 | 19 | 1.0 |
| 30 | 2+ | 3+ | 3+ | 4- | 2+ | 1+ | 3- | 2+ | 21+ | 9 | 18 | 18 | 22 | 9 | 5 | 12 | 9 | 102 | 13 | 0.7 |
| 31 | 1+ | 2+ | 3- | 3- | 2+ | 3- | 3+ | 2+ | 20- | 5 | 9 | 12 | 12 | 9 | 12 | 18 | 9 | 86 | 11 | 0.6 |

# Kp INDICES 1987 (continued)

| | Kp | | | | | | | | Sum | Nov 1987 | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3- | 3o | 2- | 2o | 2- | 2o | 1o | 0+ | 14+ | 12 15 6 7 | 6 | 7 | 4 | 2 | 59 | 7 | 0.4 |
| 2 | 2o | 2+ | 3o | 2o | 3- | 4+ | 5+ | 5o | 27- | 7 9 15 7 | 12 | 32 | 56 | 48 | 186 | 23 | 1.1 |
| 3 | 4+ | 3o | 2o | 3- | 4- | 5- | 5+ | 4+ | 30o | 32 15 7 12 | 22 | 39 | 56 | 32 | 215 | 27 | 1.2 |
| 4 | 3+ | 3- | 2o | 1+ | 3- | 1- | 2o | 2+ | 17o | 18 12 7 5 | 12 | 3 | 7 | 9 | 73 | 9 | 0.5 |
| 5 | 1+ | 1o | 2o | 3- | 2- | 3- | 3- | 4- | 18- | 5 4 7 12 | 6 | 12 | 12 | 22 | 80 | 10 | 0.6 |
| 6 | 2+ | 3+ | 2- | 2+ | 3- | 2- | 2+ | 2- | 18o | 9 18 6 9 | 12 | 6 | 9 | 6 | 75 | 9 | 0.5 |
| 7 | 1+ | 3o | 2- | 1o | 1- | 1o | 0+ | 1- | 10- | 5 15 6 4 | 3 | 4 | 2 | 3 | 42 | 5 | 0.2 |
| 8 | 1o | 1+ | 2- | 1o | 2o | 1- | 1- | 0+ | 9- | 4 5 6 4 | 7 | 3 | 3 | 2 | 34 | 4 | 0.1 |
| 9 | 0+ | 0+ | 2- | 2o | 2+ | 2o | 2+ | 5- | 16- | 2 2 6 7 | 9 | 7 | 9 | 39 | 81 | 10 | 0.6 |
| 10 | 4- | 3o | 2+ | 3o | 2+ | 1o | 1o | 2o | 18+ | 22 15 9 15 | 9 | 4 | 4 | 7 | 85 | 11 | 0.6 |
| 11 | 2+ | 3+ | 3+ | 3o | 2o | 2o | 3- | 4- | 22+ | 9 18 18 15 | 7 | 7 | 12 | 22 | 108 | 14 | 0.8 |
| 12 | 5o | 3- | 3+ | 3o | 2o | 2o | 4o | 4o | 26o | 48 12 18 15 | 7 | 7 | 27 | 27 | 161 | 20 | 1.0 |
| 13 | 4+ | 4- | 4- | 4- | 5- | 5- | 3o | 4- | 31+ | 32 22 22 22 | 39 | 39 | 15 | 22 | 213 | 27 | 1.2 |
| 14 | 4o | 4+ | 3o | 4- | 3+ | 4o | 3o | 3+ | 29- | 27 32 15 22 | 18 | 27 | 15 | 18 | 174 | 22 | 1.1 |
| 15 | 3+ | 3- | 3o | 3o | 2+ | 3- | 3o | 3- | 23- | 18 12 15 15 | 9 | 12 | 15 | 12 | 108 | 14 | 0.8 |
| 16 | 3o | 3o | 2- | 1+ | 1o | 2+ | 1o | 1o | 14+ | 15 15 6 5 | 4 | 9 | 4 | 4 | 62 | 8 | 0.4 |
| 17 | 2- | 1- | 0+ | 0+ | 0+ | 0+ | 0+ | 0+ | 4+ | 6 3 2 2 | 2 | 2 | 2 | 2 | 21 | 3 | 0.0 |
| 18 | 1o | 2o | 1+ | 0+ | 1+ | 1o | 1+ | 2+ | 11- | 4 7 5 2 | 5 | 4 | 5 | 9 | 41 | 5 | 0.2 |
| 19 | 2o | 3+ | 3+ | 3o | 3- | 3o | 2o | 1+ | 21- | 7 18 18 15 | 12 | 15 | 7 | 5 | 97 | 12 | 0.7 |
| 20 | 2+ | 3o | 4- | 2o | 2- | 2+ | 2+ | 2o | 19+ | 9 15 22 7 | 6 | 9 | 9 | 7 | 84 | 10 | 0.6 |
| 21 | 2o | 3- | 2+ | 2o | 1+ | 0+ | 1+ | 0+ | 12+ | 7 12 9 7 | 5 | 2 | 5 | 2 | 49 | 6 | 0.3 |
| 22 | 2o | 3- | 2o | 2o | 1+ | 1+ | 2- | 2- | 15- | 7 12 7 7 | 5 | 5 | 6 | 6 | 55 | 7 | 0.3 |
| 23 | 2+ | 3o | 5+ | 5o | 5o | 3+ | 5+ | 4+ | 34- | 9 15 56 48 | 48 | 18 | 56 | 32 | 282 | 35 | 1.4 |
| 24 | 4o | 4- | 4- | 5- | 4+ | 3+ | 3- | 3+ | 30- | 27 22 22 39 | 32 | 18 | 12 | 18 | 190 | 24 | 1.1 |
| 25 | 2+ | 3o | 3+ | 2o | 4- | 3o | 2o | 2o | 21+ | 9 15 18 7 | 22 | 15 | 7 | 7 | 100 | 12 | 0.7 |
| 26 | 3o | 4- | 3- | 3- | 3+ | 4o | 2+ | 3+ | 25o | 15 22 12 12 | 18 | 27 | 9 | 18 | 133 | 17 | 0.9 |
| 27 | 3+ | 3+ | 5- | 4- | 4- | 4o | 2+ | 2+ | 27+ | 18 18 39 22 | 22 | 27 | 9 | 9 | 164 | 20 | 1.0 |
| 28 | 2o | 2+ | 2o | 3+ | 2o | 2+ | 2o | 2- | 18- | 7 9 7 18 | 7 | 9 | 7 | 6 | 70 | 9 | 0.5 |
| 29 | 2- | 1o | 0o | 1o | 0+ | 1- | 0+ | 0o | 5o | 6 4 0 4 | 2 | 3 | 2 | 0 | 21 | 3 | 0.0 |
| 30 | 0o | 0o | 0o | 1o | 1- | 1+ | 2o | 1+ | 6+ | 0 0 0 4 | 3 | 5 | 7 | 5 | 24 | 3 | 0.1 |

| | Kp | | | | | | | | Sum | Dec 1987 | ap | | | | Sum | Ap | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1+ | 2- | 1- | 2- | 1o | 1+ | 1+ | 1- | 10- | 5 6 3 6 | 4 | 5 | 5 | 3 | 37 | 5 | 0.2 |
| 2 | 2o | 1+ | 1- | 0+ | 1o | 2- | 1o | 1- | 9- | 7 5 3 2 | 4 | 6 | 4 | 3 | 34 | 4 | 0.1 |
| 3 | 3- | 4- | 3- | 2o | 2- | 4- | 2- | 2+ | 20+ | 12 22 12 7 | 6 | 22 | 6 | 9 | 96 | 12 | 0.7 |
| 4 | 2- | 1o | 1o | 0+ | 1o | 2+ | 3o | 4+ | 15- | 6 4 4 2 | 4 | 9 | 15 | 32 | 76 | 10 | 0.5 |
| 5 | 4o | 4- | 4+ | 3+ | 2o | 3- | 3o | 1+ | 24+ | 27 22 32 18 | 7 | 12 | 15 | 5 | 138 | 17 | 0.9 |
| 6 | 1o | 3- | 2- | 1o | 2o | 2+ | 2+ | 3o | 16o | 4 12 6 4 | 7 | 9 | 9 | 15 | 66 | 8 | 0.4 |
| 7 | 2o | 1+ | 1+ | 1- | 1+ | 1o | 1+ | 0+ | 9+ | 7 5 5 3 | 5 | 4 | 5 | 2 | 36 | 4 | 0.2 |
| 8 | 0+ | 0o | 0o | 0+ | 0+ | 0o | 0+ | 1- | 2o | 2 0 0 2 | 2 | 0 | 2 | 3 | 11 | 1 | 0.0 |
| 9 | 1- | 0+ | 0+ | 1- | 0+ | 0+ | 3- | 4- | 9o | 3 2 2 3 | 2 | 2 | 12 | 22 | 48 | 6 | 0.3 |
| 10 | 3- | 3- | 3o | 3+ | 4o | 5+ | 5+ | 4+ | 31- | 12 12 15 18 | 27 | 56 | 56 | 32 | 228 | 28 | 1.2 |
| 11 | 4+ | 3o | 1+ | 2- | 2+ | 3+ | 3o | 3+ | 22+ | 32 15 5 6 | 9 | 18 | 15 | 18 | 118 | 15 | 0.8 |
| 12 | 3o | 3+ | 2+ | 2+ | 2+ | 2o | 1+ | 1- | 17+ | 15 18 9 9 | 9 | 7 | 5 | 3 | 75 | 9 | 0.5 |
| 13 | 1- | 0o | 1+ | 1- | 1- | 2- | 1+ | 1+ | 8- | 3 0 5 3 | 3 | 6 | 5 | 5 | 30 | 4 | 0.1 |
| 14 | 1o | 1o | 1+ | 1- | 1- | 1- | 1+ | 2- | 8+ | 4 4 5 3 | 3 | 3 | 5 | 6 | 33 | 4 | 0.1 |
| 15 | 0o | 0+ | 1o | 1o | 2- | 4+ | 4- | 3o | 15o | 0 2 4 4 | 6 | 32 | 22 | 15 | 85 | 11 | 0.6 |
| 16 | 5- | 6- | 5+ | 4o | 5- | 5- | 3o | 4+ | 36+ | 39 67 56 27 | 39 | 39 | 15 | 32 | 314 | 39 | 1.4 |
| 17 | 3o | 4o | 2- | 3o | 3+ | 3o | 3o | 3+ | 24+ | 15 27 6 15 | 18 | 15 | 15 | 18 | 129 | 16 | 0.9 |
| 18 | 3+ | 3+ | 2+ | 2- | 1+ | 1o | 0+ | 1+ | 15- | 18 18 9 6 | 5 | 4 | 2 | 5 | 67 | 8 | 0.5 |
| 19 | 1- | 2o | 2o | 2+ | 2+ | 2- | 3- | 1+ | 15o | 3 7 7 9 | 9 | 6 | 12 | 5 | 58 | 7 | 0.4 |
| 20 | 0+ | 2- | 1+ | 1+ | 2o | 1+ | 2- | 0o | 10- | 2 6 5 5 | 7 | 5 | 6 | 0 | 36 | 4 | 0.2 |
| 21 | 1- | 3o | 1+ | 2o | 2+ | 2+ | 3o | 3+ | 18o | 3 15 5 7 | 9 | 9 | 15 | 18 | 81 | 10 | 0.6 |
| 22 | 4o | 4o | 4- | 3- | 3+ | 3- | 4o | 4+ | 29- | 27 27 22 12 | 18 | 12 | 27 | 32 | 177 | 22 | 1.1 |
| 23 | 3o | 4- | 2+ | 2+ | 2+ | 2o | 1+ | 0+ | 17+ | 15 22 9 9 | 9 | 7 | 5 | 2 | 78 | 10 | 0.5 |
| 24 | 1o | 2+ | 2- | 2o | 2- | 2- | 1+ | 2o | 14- | 4 9 6 7 | 6 | 6 | 5 | 7 | 50 | 6 | 0.3 |
| 25 | 1+ | 2+ | 2- | 2- | 2- | 1+ | 1o | 3- | 14- | 5 9 6 6 | 6 | 5 | 4 | 12 | 53 | 7 | 0.3 |
| 26 | 1+ | 2o | 1- | 2- | 1o | 1o | 1o | 1- | 9+ | 5 7 3 6 | 4 | 4 | 4 | 3 | 36 | 4 | 0.2 |
| 27 | 0+ | 0o | 0o | 0+ | 0o | 0+ | 1- | 0+ | 2o | 2 0 0 2 | 0 | 2 | 3 | 2 | 11 | 1 | 0.0 |
| 28 | 0o | 0o | 0+ | 1- | 1- | 0+ | 2- | 1o | 5- | 0 0 2 3 | 3 | 2 | 6 | 4 | 20 | 2 | 0.0 |
| 29 | 2o | 2o | 2+ | 1+ | 0+ | 0+ | 0+ | 1- | 9+ | 7 7 9 5 | 2 | 2 | 2 | 3 | 37 | 5 | 0.2 |
| 30 | 1- | 0+ | 1o | 1+ | 0+ | 0+ | 1- | 0o | 5- | 3 2 4 5 | 2 | 2 | 3 | 0 | 21 | 3 | 0.0 |
| 31 | 0+ | 1- | 1+ | 1+ | 2- | 1o | 2- | 1+ | 9+ | 2 3 5 5 | 6 | 4 | 6 | 5 | 36 | 4 | 0.2 |

# FREQUENCIES OF **Kp** INDICES 1987

| Kp | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0- | 4 | 2 | 3 | 11 | 3 | . | 1 | . | 2 | 2 | 5 | 12 |
| 0+ | 16 | 12 | 9 | 19 | 28 | 17 | 7 | 3 | 3 | 6 | 16 | 28 |
| 1- | 23 | 13 | 20 | 36 | 34 | 36 | 29 | 5 | 8 | 11 | 8 | 26 |
| 1o | 27 | 27 | 23 | 29 | 33 | 40 | 26 | 23 | 8 | 19 | 16 | 22 |
| 1+ | 34 | 20 | 32 | 39 | 31 | 35 | 29 | 30 | 11 | 26 | 15 | 33 |
| 2- | 31 | 33 | 21 | 25 | 31 | 34 | 33 | 21 | 17 | 8 | 16 | 26 |
| 2o | 24 | 21 | 28 | 22 | 25 | 23 | 30 | 26 | 27 | 28 | 34 | 16 |
| 2+ | 30 | 29 | 25 | 17 | 12 | 14 | 24 | 32 | 27 | 28 | 24 | 19 |
| 3- | 20 | 16 | 21 | 12 | 17 | 15 | 20 | 29 | 18 | 13 | 20 | 11 |
| 3o | 15 | 13 | 19 | 8 | 12 | 9 | 10 | 21 | 17 | 26 | 23 | 16 |
| 3+ | 12 | 12 | 17 | 10 | 4 | 8 | 10 | 18 | 14 | 16 | 19 | 11 |
| 4- | 8 | 11 | 8 | 6 | 6 | 2 | 8 | 10 | 27 | 16 | 16 | 7 |
| 4o | 2 | 7 | 9 | 2 | 4 | 3 | 7 | 8 | 11 | 11 | 7 | 7 |
| 4+ | 1 | 5 | 10 | 3 | 3 | 2 | 4 | 5 | 16 | 12 | 7 | 7 |
| 5- | 1 | 2 | 3 | 1 | 2 | 1 | 2 | 7 | 11 | 11 | 6 | 3 |
| 5o | | 1 | | | 2 | 1 | 4 | . | 7 | 6 | 4 | . |
| 5+ | | | | | . | | 2 | 4 | 7 | 5 | 4 | 3 |
| 6- | | | | | 1 | | . | 4 | 4 | 3 | | 1 |
| 6o | | | | | | | . | 2 | 3 | 1 | | |
| 6+ | | | | | | | . | | 2 | | | |
| 7- | | | | | | | 1 | | | | | |
| 7o | | | | | | | 1 | | | | | |
| 7+ | | | | | | | | | | | | |
| 8- | | | | | | | | | | | | |
| 8o | | | | | | | | | | | | |
| 8+ | | | | | | | | | | | | |
| 9- | | | | | | | | | | | | |
| 9o | | | | | | | | | | | | |
| | 248 | 224 | 248 | 240 | 248 | 240 | 248 | 248 | 240 | 248 | 240 | 248 |

LIST OF Kp', 1987

Reduction of Kp to Kp' due to solar flare effects as far as data were available.

| Month | Day | Eighth | Kp | Kp' |
|---|---|---|---|---|
| Jul | 24 | 4 | 1- | 0+ |

MONTHLY AVERAGES OF Ap AND Cp, 1987

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ap | 8 | 10 | 10 | 7 | 8 | 7 | 11 | 14 | 19 | 16 | 13 | 9 | 11.0 |
| Cp | 0.41 | 0.51 | 0.55 | 0.34 | 0.36 | 0.34 | 0.50 | 0.66 | 0.87 | 0.73 | 0.63 | 0.43 | 0.53 |

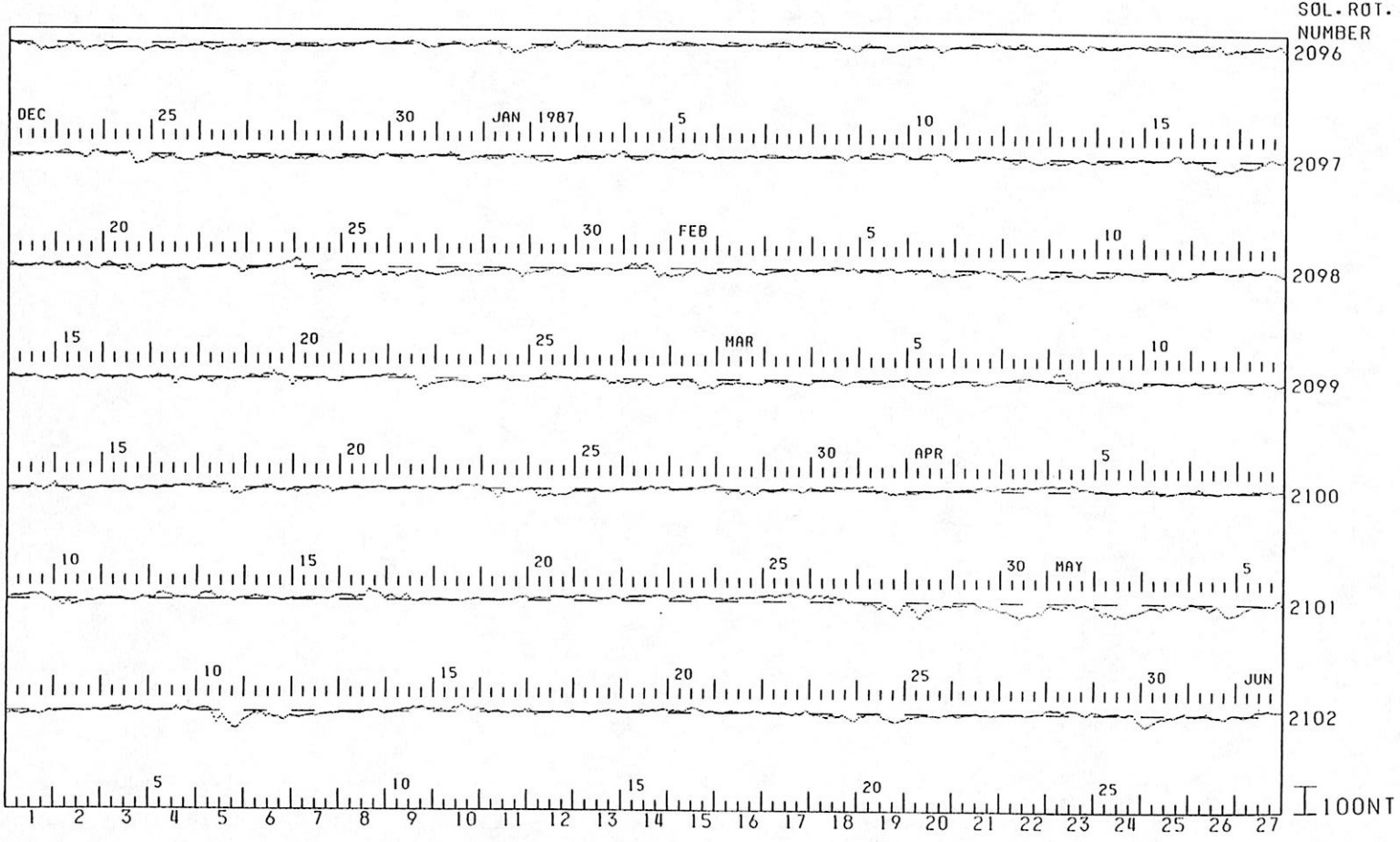
# MONTHLY AND YEARLY **Ap** 1932 - 1987

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1932 | 11 | 12 | 18 | 17 | 15 | 7 | 7 | 12 | 12 | 10 | 8 | 9 | 11.5 |
| 1933 | 10 | 11 | 12 | 12 | 12 | 8 | 7 | 9 | 12 | 10 | 9 | 7 | 10.1 |
| 1934 | 6 | 8 | 11 | 6 | 7 | 5 | 6 | 9 | 10 | 6 | 5 | 8 | 7.2 |
| 1935 | 9 | 10 | 10 | 8 | 6 | 9 | 7 | 5 | 13 | 12 | 8 | 9 | 8.9 |
| 1936 | 9 | 11 | 9 | 15 | 10 | 12 | 11 | 5 | 5 | 9 | 10 | 5 | 9.1 |
| 1937 | 7 | 13 | 12 | 20 | 13 | 12 | 12 | 10 | 9 | 20 | 12 | 10 | 12.5 |
| 1938 | 28 | 16 | 13 | 18 | 18 | 9 | 13 | 12 | 17 | 16 | 10 | 11 | 15.3 |
| 1939 | 7 | 15 | 19 | 28 | 21 | 15 | 19 | 19 | 13 | 22 | 9 | 11 | 16.5 |
| 1940 | 15 | 12 | 36 | 18 | 13 | 16 | 12 | 11 | 14 | 14 | 16 | 15 | 16.1 |
| 1941 | 14 | 18 | 33 | 15 | 11 | 11 | 19 | 16 | 27 | 11 | 16 | 11 | 16.8 |
| 1942 | 9 | 12 | 22 | 17 | 8 | 8 | 13 | 13 | 17 | 22 | 15 | 11 | 13.8 |
| 1943 | 11 | 9 | 13 | 14 | 14 | 12 | 15 | 31 | 25 | 24 | 20 | 14 | 17.0 |
| 1944 | 13 | 12 | 17 | 15 | 9 | 8 | 6 | 9 | 10 | 11 | 6 | 14 | 10.8 |
| 1945 | 10 | 10 | 17 | 13 | 9 | 7 | 9 | 7 | 10 | 11 | 8 | 13 | 10.4 |
| 1946 | 12 | 22 | 33 | 20 | 18 | 16 | 22 | 11 | 34 | 13 | 12 | 9 | 18.6 |
| 1947 | 12 | 12 | 32 | 18 | 14 | 16 | 16 | 25 | 32 | 23 | 14 | 11 | 18.8 |
| 1948 | 12 | 13 | 17 | 13 | 19 | 10 | 10 | 20 | 15 | 27 | 16 | 13 | 15.4 |
| 1949 | 20 | 14 | 19 | 14 | 18 | 14 | 8 | 14 | 13 | 25 | 15 | 9 | 15.4 |
| 1950 | 12 | 18 | 14 | 18 | 16 | 14 | 14 | 25 | 22 | 28 | 20 | 16 | 18.1 |
| 1951 | 16 | 22 | 21 | 27 | 20 | 17 | 20 | 22 | 40 | 24 | 18 | 20 | 22.3 |
| 1952 | 19 | 26 | 33 | 34 | 27 | 18 | 15 | 13 | 23 | 20 | 12 | 15 | 21.2 |
| 1953 | 15 | 15 | 21 | 16 | 16 | 13 | 16 | 19 | 21 | 16 | 14 | 7 | 15.7 |
| 1954 | 9 | 16 | 16 | 14 | 7 | 6 | 8 | 10 | 17 | 15 | 9 | 6 | 11.0 |
| 1955 | 12 | 12 | 14 | 14 | 11 | 9 | 8 | 9 | 13 | 11 | 13 | 8 | 11.3 |
| 1956 | 18 | 15 | 20 | 27 | 26 | 17 | 13 | 15 | 18 | 14 | 24 | 10 | 18.0 |
| 1957 | 17 | 17 | 26 | 21 | 11 | 22 | 16 | 14 | 49 | 14 | 18 | 18 | 20.1 |
| 1958 | 15 | 27 | 26 | 20 | 17 | 24 | 25 | 18 | 20 | 16 | 8 | 15 | 19.2 |
| 1959 | 14 | 24 | 24 | 17 | 19 | 15 | 32 | 23 | 28 | 19 | 22 | 19 | 21.3 |
| 1960 | 15 | 14 | 18 | 42 | 24 | 20 | 20 | 20 | 20 | 36 | 32 | 21 | 23.6 |
| 1961 | 12 | 16 | 14 | 14 | 13 | 14 | 28 | 11 | 13 | 16 | 10 | 12 | 14.4 |
| 1962 | 7 | 11 | 8 | 14 | 7 | 9 | 12 | 15 | 19 | 20 | 13 | 13 | 12.3 |
| 1963 | 11 | 9 | 8 | 10 | 11 | 11 | 12 | 13 | 28 | 15 | 12 | 11 | 12.6 |
| 1964 | 12 | 12 | 13 | 13 | 10 | 9 | 9 | 8 | 11 | 10 | 7 | 5 | 9.9 |
| 1965 | 6 | 9 | 8 | 8 | 6 | 10 | 8 | 9 | 10 | 7 | 6 | 7 | 7.7 |
| 1966 | 7 | 8 | 13 | 7 | 9 | 6 | 9 | 11 | 21 | 11 | 9 | 11 | 10.2 |
| 1967 | 11 | 11 | 7 | 9 | 25 | 12 | 8 | 9 | 16 | 10 | 10 | 14 | 12.0 |
| 1968 | 11 | 16 | 13 | 13 | 13 | 17 | 10 | 12 | 14 | 16 | 17 | 10 | 13.5 |
| 1969 | 8 | 15 | 17 | 14 | 17 | 9 | 8 | 8 | 15 | 9 | 10 | 7 | 11.3 |
| 1970 | 7 | 7 | 18 | 15 | 9 | 10 | 19 | 13 | 11 | 12 | 12 | 9 | 11.9 |
| 1971 | 12 | 12 | 11 | 15 | 13 | 9 | 8 | 9 | 13 | 12 | 11 | 10 | 11.3 |
| 1972 | 13 | 10 | 12 | 11 | 10 | 14 | 8 | 24 | 13 | 12 | 14 | 10 | 12.6 |
| 1973 | 16 | 20 | 25 | 30 | 17 | 17 | 12 | 12 | 14 | 18 | 12 | 11 | 17.0 |
| 1974 | 15 | 16 | 23 | 21 | 18 | 17 | 24 | 19 | 23 | 26 | 18 | 15 | 19.6 |
| 1975 | 16 | 18 | 20 | 16 | 13 | 11 | 12 | 10 | 10 | 12 | 18 | 12 | 13.9 |
| 1976 | 13 | 17 | 23 | 17 | 14 | 10 | 9 | 9 | 13 | 12 | 9 | 10 | 12.9 |
| 1977 | 10 | 11 | 11 | 16 | 11 | 8 | 14 | 13 | 16 | 13 | 10 | 10 | 11.9 |
| 1978 | 15 | 16 | 17 | 24 | 25 | 20 | 13 | 17 | 18 | 12 | 15 | 13 | 17.0 |
| 1979 | 16 | 15 | 19 | 25 | 14 | 12 | 12 | 18 | 14 | 12 | 10 | 9 | 14.5 |
| 1980 | 10 | 11 | 8 | 11 | 10 | 13 | 11 | 10 | 8 | 14 | 13 | 13 | 11.1 |
| 1981 | 9 | 14 | 18 | 28 | 20 | 12 | 19 | 15 | 12 | 23 | 15 | 10 | 16.3 |
| 1982 | 12 | 33 | 18 | 22 | 17 | 22 | 30 | 21 | 36 | 18 | 21 | 21 | 22.4 |
| 1983 | 16 | 27 | 23 | 24 | 22 | 15 | 12 | 16 | 14 | 17 | 21 | 15 | 18.5 |
| 1984 | 13 | 17 | 21 | 25 | 17 | 15 | 16 | 16 | 24 | 23 | 21 | 18 | 18.8 |
| 1985 | 16 | 15 | 11 | 21 | 9 | 11 | 14 | 13 | 13 | 14 | 15 | 13 | 13.7 |
| 1986 | 14 | 27 | 13 | 8 | 12 | 8 | 8 | 12 | 17 | 11 | 13 | 8 | 12.5 |
| 1987 | 8 | 10 | 10 | 7 | 8 | 7 | 11 | 14 | 19 | 16 | 13 | 9 | 11.0 |

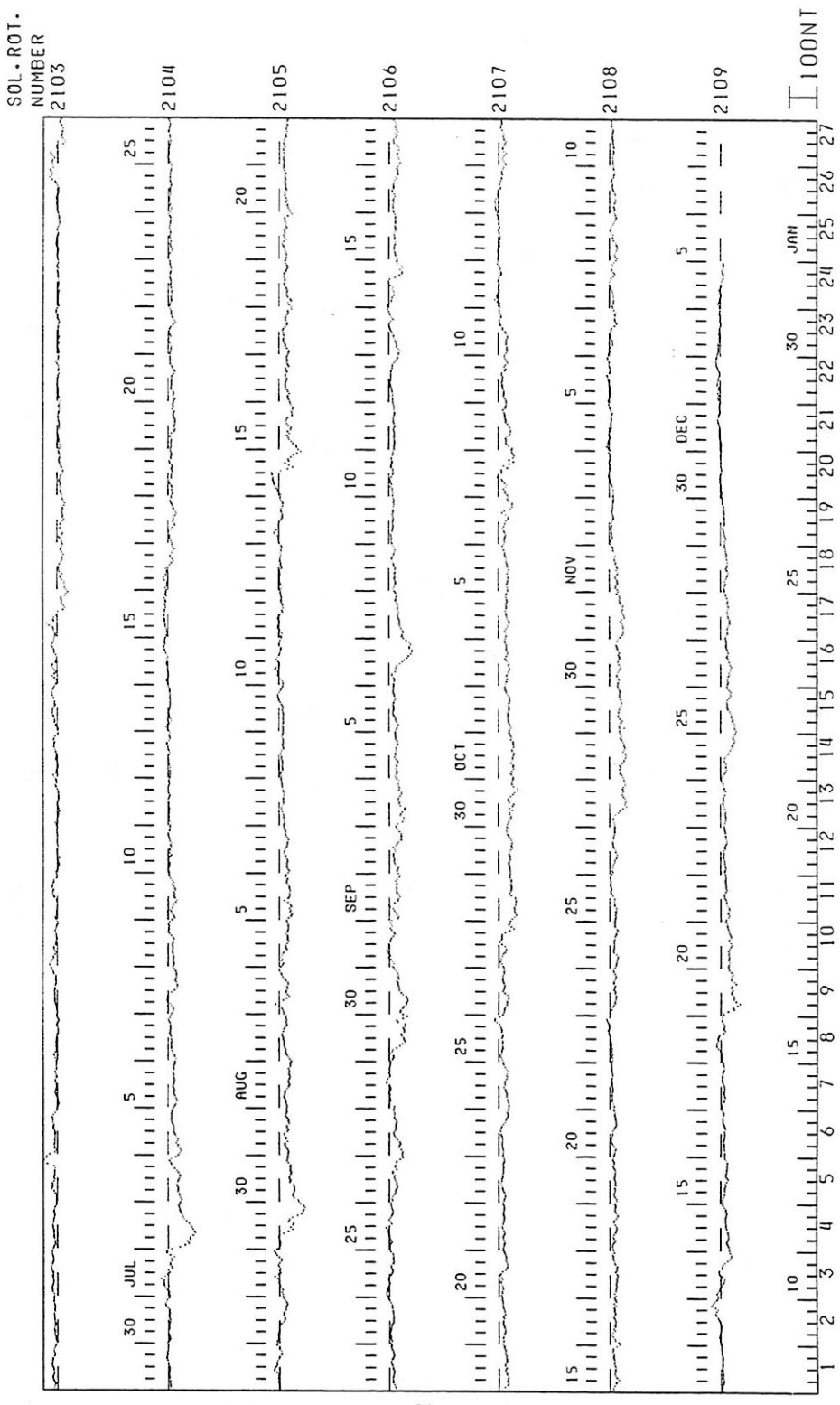
# SECTION 3

## 3.4. Dst INDICES


- Hourly values of **Dst** 1987 (graph) 85
- Monthly tables of **Dst** hourly values 87
- Tables of daily means of **Dst** 99
- Monthly and yearly mean values
  1957 - 1987 100




HOURLY VALUES OF **Dst** 1987


SOL. ROT. NUMBER
2103
2104
2105
2106
2107
2108
2109
JUL
AUG
SEP
OCT
NOV
DEC
JAN
HOONT

JANUARY 1987

UNIT=NT

| DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | U.T. 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 6 | 8 | 4 | 3 | 3 | 6 | -2 | -10 | -15 | -18 | -15 | -13 | -21 | -30 | -31 | -26 | -32 | -31 | -26 | -22 | -24 | -18 |
| 2 | -15 | -13 | -14 | -8 | -5 | -6 | -7 | -11 | -10 | -8 | -7 | -3 | 4 | -7 | -15 | -17 | -19 | -16 | -13 | -13 | -13 | -6 | 0 | 5 |
| 3 | 9 | 11 | 5 | -4 | -11 | -9 | -11 | -10 | -9 | -10 | -11 | -9 | -9 | -7 | -5 | -8 | -10 | -10 | -9 | -8 | -10 | -11 | -10 | -6 |
| 4 | -3 | -1 | -2 | -3 | -2 | -3 | -2 | -6 | -5 | -3 | -3 | 1 | 4 | 4 | 3 | 3 | 1 | 1 | 0 | 1 | 1 | -2 | -2 | 0 |
| 5 | 4 | 4 | 5 | 10 | 9 | 7 | 4 | 5 | 6 | 5 | 4 | 4 | 3 | -1 | 0 | 1 | 0 | -1 | 4 | 3 | 3 | 2 | 2 | 0 |
| 6 | 0 | -3 | -2 | -1 | 3 | 8 | 9 | 8 | 7 | 6 | 5 | 1 | 2 | 2 | 2 | 0 | -1 | 2 | 2 | 2 | 0 | -2 | -2 | -2 |
| 7 | -4 | 2 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 11 | 8 | 8 | 6 | 3 | -1 | -2 | -2 | -4 | -2 | 1 | 4 | 4 | 3 | 5 |
| 8 | 4 | 4 | 4 | 3 | 3 | 4 | 10 | 11 | 10 | 9 | 14 | 14 | 10 | 6 | 1 | -7 | -9 | -8 | -6 | -11 | -15 | -20 | -19 | -17 |
| 9 | -12 | -5 | 3 | 5 | 9 | 2 | -3 | 0 | -3 | -1 | -2 | -3 | -7 | -18 | -20 | -20 | -20 | -19 | -15 | -12 | -9 | -9 | -10 | -10 |
| 10 | -10 | -7 | -4 | 0 | 0 | -4 | -1 | 0 | 4 | 6 | 2 | 0 | 2 | -1 | -4 | -9 | -18 | -19 | -16 | -11 | -9 | -6 | -4 | -4 |
| 11 | -3 | -1 | 0 | -1 | -3 | -1 | 0 | 4 | 8 | 9 | 8 | 9 | 7 | 5 | 3 | 5 | 2 | 2 | 3 | 6 | 15 | 10 | 6 | 3 |
| 12 | 3 | -1 | 6 | 5 | -3 | -5 | -5 | 3 | 8 | 10 | 10 | 5 | 5 | 0 | -4 | -9 | -12 | -10 | -5 | -4 | -2 | -3 | -2 | -3 |
| 13 | -2 | -2 | -1 | 1 | 0 | -2 | 0 | 0 | 1 | 3 | 7 | 7 | 7 | 3 | 0 | -6 | -11 | -10 | -3 | 5 | 9 | 7 | 6 | 3 |
| 14 | 0 | 3 | 4 | 3 | 0 | -2 | -3 | -3 | 1 | 2 | 4 | 2 | 1 | 1 | 3 | 3 | 3 | 5 | 6 | 4 | 4 | 7 | 4 | 2 |
| 15 | 2 | 5 | 10 | 9 | 7 | 5 | 4 | 8 | 8 | 7 | 7 | 7 | 6 | 5 | 4 | -1 | -5 | 1 | 5 | 9 | 8 | -1 | -4 | -6 |
| 16 | -8 | -9 | -4 | -3 | 1 | 4 | 11 | 13 | 8 | -1 | 0 | -1 | 6 | 10 | 10 | -2 | -11 | -13 | -11 | -9 | -10 | -6 | -3 | -5 |
| 17 | -10 | -10 | -6 | -4 | -4 | 0 | 2 | 7 | 9 | 8 | 7 | 10 | 10 | 4 | 3 | 0 | 2 | 1 | 3 | 8 | 12 | 11 | -1 | -9 |
| 18 | -10 | -11 | -8 | -8 | -9 | -10 | -12 | -12 | -7 | -2 | -7 | -5 | -3 | -3 | -5 | -5 | -6 | -5 | -2 | -1 | 0 | -4 | -3 | 1 |
| 19 | 0 | 1 | 4 | 5 | 8 | 9 | 7 | 4 | -3 | -1 | -1 | -3 | -6 | -8 | -13 | -15 | -11 | -5 | 4 | 5 | 9 | 8 | 1 | 1 |
| 20 | 1 | 2 | -2 | -4 | -4 | -7 | -11 | -8 | -2 | 1 | 1 | 1 | 0 | 3 | -6 | -19 | -34 | -36 | -33 | -30 | -33 | -28 | -25 | -20 |
| 21 | -14 | -11 | -9 | -10 | -13 | -17 | -18 | -14 | -11 | -9 | -10 | -9 | -15 | -19 | -19 | -20 | -24 | -23 | -22 | -21 | -23 | -21 | -13 | -12 |
| 22 | -14 | -12 | -10 | -10 | -8 | -7 | -7 | -2 | 0 | 2 | -1 | -8 | -7 | -7 | -8 | -7 | -8 | -15 | -18 | -14 | -11 | -13 | -13 | -14 |
| 23 | -17 | -16 | -12 | -14 | -14 | -13 | -9 | -8 | -9 | -10 | -12 | -16 | -16 | -13 | -7 | -11 | -16 | -14 | -12 | -9 | -12 | -15 | -14 | -16 |
| 24 | -16 | -16 | -15 | -10 | -14 | -18 | -16 | -12 | -10 | -9 | -7 | -8 | -10 | -9 | -10 | -8 | -11 | -14 | -17 | -16 | -14 | -12 | -13 | -14 |
| 25 | -14 | -12 | -9 | -9 | -10 | -11 | -11 | -13 | -12 | -10 | -9 | -8 | -7 | -8 | -10 | -11 | -14 | -13 | -9 | -4 | -2 | -1 | 2 | 2 |
| 26 | -2 | -5 | -7 | -8 | -8 | -10 | -13 | -6 | -7 | -6 | -2 | -5 | -7 | -11 | -9 | -7 | -6 | -6 | -7 | -9 | -5 | -4 | -3 | -1 |
| 27 | -2 | -4 | -5 | -5 | -6 | -5 | 1 | 7 | 4 | 1 | -6 | -15 | -17 | -17 | -17 | -14 | -15 | -13 | -9 | -7 | -6 | -9 | -5 | -6 |
| 28 | -8 | -8 | -12 | -15 | -12 | -12 | -12 | -13 | -9 | -11 | -10 | -4 | -1 | 1 | 0 | 2 | 0 | -6 | -7 | 1 | 0 | -6 | -8 | -7 |
| 29 | -9 | -8 | -11 | -16 | -20 | -22 | -21 | -18 | -16 | -19 | -21 | -20 | -17 | -14 | -14 | -15 | -17 | -18 | -17 | -16 | -15 | -13 | -10 | -11 |
| 30 | -10 | -11 | -7 | -6 | -8 | -8 | -8 | -10 | -12 | -12 | -11 | -7 | -6 | -5 | -3 | 2 | 4 | 0 | -3 | -3 | 1 | 6 | 8 | 14 |
| 31 | 13 | 9 | 2 | -7 | -11 | -12 | -14 | -14 | -13 | -12 | -13 | -9 | -4 | 1 | 3 | 4 | 1 | -1 | 0 | -3 | -5 | -4 | -5 | -6 |

FEBRUARY 1987

UNIT=NT

| DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | U.T. |
| 1 | -4 | -1 | 0 | -2 | -8 | -5 | -1 | 2 | 3 | 2 | -3 | -4 | -2 | 0 | 2 | 5 | 8 | 1 | -4 | -6 | -6 | -5 | -9 | -8 |
| 2 | -6 | -5 | -3 | -3 | -5 | -5 | -3 | -3 | -4 | -2 | -4 | -5 | -3 | -2 | -1 | 1 | 3 | 1 | 1 | -2 | -2 | 0 | 1 | 1 |
| 3 | 2 | 6 | 7 | 6 | 5 | 5 | 4 | 0 | 1 | 2 | -1 | -3 | -1 | -1 | -1 | 1 | 0 | -1 | -2 | -3 | -2 | 0 | 2 | 1 |
| 4 | 0 | 1 | -1 | -1 | 1 | 1 | 3 | 2 | 3 | 3 | 5 | 5 | 5 | 2 | 1 | -1 | -7 | -9 | -5 | 1 | 3 | 6 | 8 | 7 |
| 5 | 4 | 0 | 1 | 2 | 3 | 6 | 13 | 13 | 15 | 11 | 9 | 10 | 9 | 6 | 6 | 5 | 7 | 14 | 17 | 16 | 16 | 14 | 12 | 6 |
| 6 | 4 | 2 | 0 | -2 | -2 | -1 | 3 | 7 | 9 | 11 | 14 | 11 | 9 | 12 | 11 | 12 | 16 | 16 | 14 | 13 | 8 | 4 | -3 | -8 |
| 7 | -7 | -7 | -9 | -8 | -8 | -7 | -6 | -5 | -6 | -3 | 5 | 8 | 7 | 4 | 5 | 5 | 2 | 3 | 6 | 6 | 4 | 0 | 0 | 0 |
| 8 | 3 | 6 | -4 | -7 | -6 | -15 | -20 | -19 | -12 | -10 | -2 | 0 | -3 | -8 | -9 | -13 | -15 | -18 | -20 | -20 | -18 | -15 | -12 | -11 |
| 9 | -17 | -17 | -13 | -15 | -19 | -20 | -18 | -18 | -19 | -15 | -12 | -7 | -8 | -11 | -9 | -7 | -4 | -3 | -5 | -7 | -10 | -14 | -14 | -13 |
| 10 | -6 | -5 | -6 | -8 | -14 | -16 | -13 | -11 | -11 | -12 | -12 | -10 | -9 | -10 | -4 | -2 | -4 | -5 | -4 | -4 | -4 | 1 | 1 | 2 |
| 11 | 0 | -2 | -1 | -3 | -7 | -6 | -4 | -4 | -3 | -4 | -3 | -2 | -2 | 1 | 6 | 11 | 14 | 14 | 10 | -1 | -6 | -7 | -2 | -3 |
| 12 | 0 | -3 | -5 | -6 | -5 | -12 | -22 | -24 | -27 | -30 | -32 | -36 | -42 | -40 | -42 | -39 | -34 | -36 | -37 | -38 | -38 | -37 | -33 | -31 |
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| 14 | 3 | 5 | 7 | 3 | -1 | -7 | -9 | -8 | -3 | -3 | -4 | -5 | -3 | 0 | 1 | -2 | 1 | 4 | 1 | 0 | -1 | -3 | -1 | 3 |
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| 16 | 1 | 3 | 7 | 9 | 6 | 3 | 1 | -5 | -9 | -14 | -16 | -16 | -11 | 0 | -1 | -9 | -17 | -20 | -21 | -22 | -18 | -17 | -18 | -14 |
| 17 | -10 | -8 | -4 | -1 | -6 | -9 | -11 | -11 | -8 | -7 | -4 | -2 | -5 | -3 | -3 | 0 | 1 | 0 | -8 | -10 | -13 | -15 | -12 | -7 |
| 18 | -5 | -6 | -8 | -8 | -8 | -8 | -8 | -6 | -4 | -2 | 2 | 1 | 1 | 1 | 3 | 5 | 0 | -1 | -3 | -6 | -13 | -22 | -23 | -20 |
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| 1 | -8 | -5 | -9 | -15 | -16 | -16 | -14 | -11 | -8 | -4 | -1 | 0 | -2 | -3 | -2 | -2 | -4 | -4 | -12 | -15 | -21 | -18 | -18 | -20 |
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| 7 | -29 | -27 | -20 | -14 | -17 | -19 | -25 | -32 | -37 | -39 | -31 | -25 | -25 | -29 | -27 | -23 | -21 | -20 | -19 | -22 | -24 | -24 | -22 | -20 |
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| 9 | -22 | -22 | -21 | -19 | -22 | -17 | -18 | -21 | -19 | -13 | -9 | -6 | -8 | -9 | -6 | -7 | -7 | -7 | -9 | -11 | -12 | -12 | -12 | -15 |
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| 12 | -9 | -9 | -10 | -4 | -2 | 1 | 1 | -3 | -7 | -6 | -6 | 0 | 5 | 6 | 1 | 1 | -2 | 0 | -2 | -2 | -7 | -11 | -15 | -16 |
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| 14 | -14 | -15 | -10 | -8 | -8 | -7 | -3 | 1 | 0 | 0 | 0 | -2 | -1 | 1 | 3 | 1 | -2 | -5 | -10 | -10 | -7 | -1 | 1 | 1 |
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| 24 | -11 | -12 | -6 | -3 | -2 | 0 | 4 | 10 | 15 | 4 | 1 | 1 | 5 | 5 | 4 | 3 | 4 | 3 | 2 | 2 | 1 | 1 | -1 | -7 |
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| 26 | -14 | -17 | -17 | -16 | -13 | -11 | -11 | -10 | -23 | -20 | -11 | -10 | -7 | -9 | -18 | -23 | -23 | -23 | -19 | -20 | -17 | -13 | -7 | -7 |
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| 29 | -14 | -10 | -8 | -7 | -9 | -12 | -12 | -10 | -11 | -14 | -14 | -10 | -8 | -8 | -8 | -9 | -9 | -12 | -14 | -15 | -17 | -17 | -19 | -18 |
| 30 | -15 | -10 | -7 | -5 | -5 | -4 | -5 | -5 | -4 | -2 | -2 | -4 | -7 | -8 | -9 | -15 | -20 | -18 | -16 | -13 | -10 | -7 | -8 | -7 |
| 31 | -7 | -8 | -9 | -11 | -10 | -10 | -10 | -13 | -13 | -14 | -13 | -12 | -10 | -9 | -6 | -3 | -3 | -4 | -2 | -3 | -2 | 1 | 2 | 5 |

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| 1 | 9 | 1 | -4 | -10 | -18 | -22 | -26 | -26 | -28 | -29 | -30 | -24 | -19 | -16 | -16 | -17 | -18 | -18 | -19 | -17 | -15 | -12 | -13 | -12 |
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| 4 | 1 | 2 | 1 | 20 | 26 | 22 | 24 | 25 | 25 | 8 | -15 | -19 | -11 | -23 | -28 | -25 | -20 | -18 | -17 | -15 | -13 | -12 | -9 | -11 |
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| 6 | -11 | -9 | -10 | -12 | -10 | -7 | -5 | -3 | -2 | -4 | -4 | -7 | -7 | -5 | -6 | -4 | -5 | -5 | -8 | -10 | -9 | -7 | -7 | -8 |
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| 20 | -4 | -1 | -1 | -7 | -16 | -27 | -24 | -28 | -25 | -26 | -21 | -20 | -22 | -25 | -26 | -23 | -21 | -21 | -22 | -22 | -20 | -17 | -15 | -10 |
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| 24 | 13 | 10 | 9 | 6 | -1 | -12 | -16 | -10 | -5 | -5 | -7 | -6 | -12 | -17 | -15 | -8 | -7 | -9 | -14 | -19 | -19 | -13 | -6 | -2 |
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| 27 | 8 | 8 | 9 | 13 | 12 | 9 | 11 | 13 | 0 | -9 | -7 | -4 | -3 | -7 | -7 | -11 | -15 | -12 | -13 | -16 | -12 | -11 | -12 | -11 |
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| 30 | 9 | 7 | 9 | 11 | 14 | 12 | 10 | 10 | 11 | 13 | 12 | 13 | 14 | 15 | 12 | 11 | 10 | 11 | 13 | 11 | 15 | 17 | 15 | 19 |

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| 1 | 17 | 18 | 19 | 20 | 17 | 13 | 15 | 17 | 17 | 18 | 14 | 16 | 22 | 20 | 18 | 15 | 5 | 7 | 7 | 8 | 8 | 3 | 3 | 2 |
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| 6 | 4 | 4 | 6 | 8 | 9 | 9 | 8 | 9 | 9 | 10 | 10 | 12 | 15 | 15 | 16 | 15 | 12 | 17 | 15 | 10 | 6 | 1 | -3 | -10 |
| 7 | -10 | -8 | -8 | -16 | -24 | -24 | -12 | -10 | -13 | -22 | -21 | -19 | -16 | -13 | -12 | -13 | -9 | -8 | -8 | -9 | -10 | -7 | -4 | -2 |
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| 9 | 4 | 4 | 2 | 5 | 16 | 18 | 18 | 21 | 17 | 14 | 14 | 12 | 5 | 4 | 4 | 4 | 2 | 2 | 4 | 4 | 3 | 0 | 0 | -1 |
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| 11 | 4 | 4 | 4 | 6 | 8 | 10 | 11 | 9 | 6 | 7 | 4 | 3 | 4 | 3 | 2 | 1 | 1 | -3 | -4 | -5 | -5 | -2 | -2 | 1 |
| 12 | 2 | 2 | 0 | 0 | 2 | 2 | 3 | 4 | 5 | 4 | 6 | 5 | 4 | 3 | 2 | 2 | 1 | 1 | 0 | 1 | 4 | 7 | 10 | 13 |
| 13 | 13 | 14 | 14 | 14 | 14 | 13 | 13 | 9 | 5 | 8 | 11 | 11 | 11 | 13 | 27 | 35 | 33 | 28 | 26 | 25 | 22 | 18 | 10 | 4 |
| 14 | 8 | 12 | 15 | 13 | 8 | 3 | 1 | 2 | 7 | 14 | 18 | 9 | 3 | -3 | -4 | -6 | -5 | -2 | -1 | 1 | -1 | -2 | -2 | 0 |
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| 16 | 3 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | -3 | -2 | -3 | -1 | -1 | 0 | 0 | 0 | 0 | 2 | 5 | 8 | 10 | 9 | 10 | 11 |
| 17 | 7 | 3 | 3 | 5 | 6 | 7 | 7 | 6 | 6 | 6 | 4 | 5 | 10 | 11 | 12 | 12 | 11 | 11 | 11 | 9 | 9 | 9 | 10 | 8 |
| 18 | 11 | 14 | 15 | 14 | 14 | 15 | 15 | 13 | 9 | 8 | 8 | 6 | 5 | 5 | 5 | 6 | 6 | 5 | 7 | 11 | 13 | 12 | 9 | 6 |
| 19 | 3 | 5 | 8 | 9 | 13 | 13 | 13 | 13 | 13 | 15 | 14 | 15 | 15 | 13 | 13 | 12 | 15 | 16 | 17 | 17 | 17 | 16 | 14 | 12 |
| 20 | 8 | 5 | 6 | 9 | 12 | 14 | 13 | 16 | 15 | 10 | 8 | 7 | 8 | 10 | 11 | 12 | 12 | 12 | 13 | 13 | 11 | 9 | 8 | 8 |
| 21 | 9 | 8 | 9 | 7 | 5 | 4 | 4 | 7 | 9 | 10 | 8 | 7 | 10 | 11 | 10 | 11 | 11 | 12 | 11 | 11 | 11 | 12 | 14 | 15 |
| 22 | 15 | 16 | 18 | 20 | 19 | 18 | 14 | 15 | 19 | 19 | 22 | 21 | 22 | 25 | 26 | 19 | 17 | 20 | 22 | 22 | 21 | 17 | 16 | 12 |
| 23 | 8 | 13 | 17 | 20 | 19 | 19 | 21 | 13 | 15 | 18 | 12 | 10 | 14 | 14 | 7 | 8 | 9 | 10 | 4 | -2 | -4 | 0 | -3 | -2 |
| 24 | -3 | -2 | -3 | -9 | -13 | -10 | -8 | -9 | -13 | -19 | -27 | -24 | -17 | -12 | -13 | -21 | -23 | -24 | -34 | -40 | -46 | -37 | -26 | -13 |
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| 26 | -12 | -13 | -13 | -13 | -12 | -11 | -12 | -13 | -2 | -2 | -1 | -4 | -9 | -13 | -17 | -14 | -14 | -16 | -20 | -24 | -22 | -23 | -25 | -31 |
| 27 | -33 | -33 | -33 | -32 | -37 | -42 | -45 | -47 | -49 | -53 | -58 | -54 | -50 | -45 | -45 | -47 | -47 | -45 | -41 | -34 | -37 | -40 | -31 | -23 |
| 28 | -16 | -12 | -11 | -17 | -18 | -18 | -19 | -22 | -22 | -12 | -14 | -6 | -2 | -2 | -5 | -14 | -12 | -11 | -10 | -7 | -8 | -11 | -17 | -18 |
| 29 | -15 | -22 | -23 | -38 | -45 | -34 | -33 | -44 | -40 | -42 | -51 | -51 | -44 | -47 | -49 | -50 | -50 | -45 | -41 | -40 | -39 | -38 | -35 | -32 |
| 30 | -30 | -27 | -23 | -20 | -17 | -16 | -16 | -16 | -20 | -23 | -25 | -18 | -14 | -17 | -20 | -14 | -8 | -7 | -11 | -11 | -16 | -16 | -15 | -11 |
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| 17 | 1 | 0 | -3 | -3 | -4 | -1 | 1 | 3 | 5 | 5 | 3 | 2 | 0 | -2 | -1 | -1 | 0 | 0 | 1 | 3 | 6 | 3 | 2 | 1 |
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| 24 | 12 | 13 | 14 | 12 | 11 | 13 | 12 | 10 | 4 | 4 | 8 | 11 | 13 | 12 | 11 | 10 | 9 | 5 | 0 | -2 | -4 | -2 | 3 | 8 |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8 | 9 | 14 | 15 | 16 | 14 | 12 | 11 | 11 | 12 | 13 | 12 | 13 | 17 | 19 | 19 | 15 | 13 | 11 | 11 | 13 | 15 | 16 | 15 |
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| 4 | 24 | 6 | 1 | 7 | 7 | 8 | 6 | 6 | 6 | 5 | 5 | 5 | 7 | 10 | 11 | 9 | 12 | 12 | 13 | 16 | 11 | 5 | 1 | -2 |
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| 6 | 1 | 5 | 8 | 9 | 5 | 2 | 0 | 2 | 2 | 2 | 1 | 0 | -1 | -3 | -5 | -5 | -5 | -3 | -1 | -4 | -8 | -6 | -2 | -1 |
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| 8 | 22 | 24 | 20 | 15 | 11 | 11 | 5 | 3 | 7 | 9 | 9 | 3 | 2 | 1 | -1 | 0 | 1 | 3 | 5 | 3 | 2 | -1 | -5 | -3 |
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| 8 | -9 | -10 | -11 | -12 | -11 | -11 | -11 | -8 | -5 | -5 | -4 | -4 | -6 | -9 | -6 | -3 | -2 | 1 | 1 | -7 | -11 | -9 | -8 | -10 |
| 9 | -6 | -1 | 4 | 0 | -7 | -14 | -13 | -9 | -8 | -6 | -6 | -8 | -10 | -10 | -12 | -11 | -12 | -10 | -10 | -11 | -9 | -9 | -8 | -5 |
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| 11 | 7 | 3 | 0 | 3 | 4 | 6 | 8 | 8 | 9 | 10 | 11 | 12 | 11 | 10 | 10 | 7 | 8 | 9 | 6 | 8 | 10 | 4 | 6 | 5 |
| 12 | 4 | 7 | 4 | 1 | 1 | 10 | 14 | 11 | 5 | 3 | 3 | 4 | -4 | -10 | -16 | -22 | -19 | -12 | -10 | -17 | -21 | -25 | -21 | -18 |
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| 26 | -75 | -72 | -57 | -52 | -53 | -57 | -58 | -57 | -56 | -55 | -41 | -43 | -39 | -39 | -43 | -46 | -43 | -43 | -43 | -43 | -36 | -31 | -32 | -33 |
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| 1 | -29 | -37 | -45 | -49 | -42 | -44 | -40 | -46 | -43 | -34 | -22 | -35 | -39 | -41 | -41 | -42 | -40 | -39 | -34 | -29 | -30 | -32 | -25 | -27 |
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OCTOBER 1987

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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NOVEMBER 1987

| DAY | UNIT=NT 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | U.T. 24 |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| 29 | -2 | -2 | 4 | 6 | 3 | 6 | 6 | 4 | 3 | 8 | 7 | 6 | 5 | 3 | 0 | -1 | 1 | 5 | 7 | 10 | 11 | 12 | 11 | 10 |
| 30 | 9 | 7 | 5 | 5 | 5 | 5 | 5 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | -3 | -4 | -3 | -2 | -2 | -2 | 0 | 0 | -1 |
| 31 | 0 | 0 | 5 | 3 | 1 | -1 | -4 | -5 | -2 | 3 | 0 | -5 | -6 | -6 | -8 | -12 | -15 | -13 | -10 | -8 | -12 | -15 | -13 | -13 |

## DAILY MEANS OF EQUATORIAL DST FOR 1987

| DAY | JAN | FEB | MAR | APR | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -13 | -2 | -10 | -17 | 13 | -10 | 14 | -25 | -37 | -29 | -32 | -5 |
| 2 | -9 | -2 | -9 | -9 | -3 | -11 | 8 | -15 | -29 | -23 | -31 | -2 |
| 3 | -7 | 1 | -2 | 2 | -2 | -3 | 14 | -21 | -17 | -49 | -30 | -14 |
| 4 | -1 | 1 | -6 | -3 | -1 | 4 | 8 | -16 | -14 | -39 | -34 | -13 |
| 5 | 3 | 9 | -12 | -12 | 3 | 1 | 0 | -21 | -13 | -22 | -23 | -21 |
| 6 | 2 | 7 | -13 | -7 | 9 | -24 | 0 | -8 | -4 | -16 | -22 | -19 |
| 7 | 4 | 0 | -25 | -9 | -12 | -19 | 5 | -7 | -8 | -14 | -5 | -15 |
| 8 | 0 | -10 | -17 | -6 | -1 | -15 | 6 | -7 | -9 | -21 | -5 | -9 |
| 9 | -7 | -12 | -14 | -5 | 7 | -4 | 5 | -8 | -6 | -15 | -4 | 5 |
| 10 | -5 | -7 | -14 | -8 | 6 | 6 | -4 | 2 | -15 | -18 | -20 | -11 |
| 11 | 4 | 0 | -5 | -5 | 3 | 8 | -4 | 7 | -45 | -22 | -20 | -26 |
| 12 | -1 | -27 | -4 | 1 | 3 | -1 | 3 | -5 | -32 | -26 | -20 | -20 |
| 13 | 1 | -14 | -4 | -2 | 16 | -3 | 8 | -18 | -28 | -22 | -23 | -14 |
| 14 | 2 | -1 | -4 | -5 | 4 | 0 | 7 | -15 | -31 | -31 | -21 | -12 |
| 15 | 4 | -1 | -4 | -5 | -1 | 4 | -6 | -20 | -26 | -29 | -20 | -4 |
| 16 | -1 | -8 | -8 | -2 | 2 | 6 | -20 | -18 | -28 | -20 | -18 | -44 |
| 17 | 2 | -7 | -8 | -2 | 8 | 1 | -20 | -14 | -24 | -21 | -12 | -33 |
| 18 | -6 | -6 | 3 | 3 | 10 | -2 | -14 | -13 | -18 | -21 | -5 | -24 |
| 19 | 0 | 0 | -10 | -11 | 13 | -13 | -9 | -10 | -13 | -19 | -18 | -19 |
| 20 | -12 | -20 | -2 | -19 | 10 | -16 | -6 | -11 | -8 | -20 | -24 | -17 |
| 21 | -16 | -27 | -10 | -8 | 9 | -11 | -6 | -7 | -7 | -31 | -16 | -30 |
| 22 | -9 | -23 | -16 | 2 | 19 | -7 | -6 | 1 | -26 | -11 | -19 | -39 |
| 23 | -13 | -19 | -7 | 3 | 10 | -3 | -5 | -13 | -32 | -25 | -44 | -30 |
| 24 | -12 | -16 | 1 | -7 | -19 | 8 | 4 | -3 | -5 | -23 | -50 | -28 |
| 25 | -8 | -12 | -3 | -3 | -26 | -1 | -6 | -42 | -40 | -54 | -40 | -22 |
| 26 | -6 | -8 | -15 | 5 | -14 | -17 | -5 | -48 | -46 | -43 | -34 | -15 |
| 27 | -7 | -4 | -18 | -3 | -42 | -5 | -5 | -30 | -8 | -48 | -46 | -6 |
| 28 | -7 | -17 | -17 | -5 | -13 | 6 | -3 | -33 | -28 | -52 | -26 | -1 |
| 29 | -16 | 0 | -12 | 4 | -40 | 9 | -66 | -25 | -31 | -38 | -13 | 5 |
| 30 | -4 | 0 | -9 | 12 | -17 | 6 | -34 | -19 | -44 | -33 | -8 | 1 |
| 31 | -4 | 0 | -7 | 0 | -20 | 0 | -28 | -25 | 0 | -31 | 0 | -6 |
| MEAN | -5 | -8 | -9 | -4 | -2 | -4 | -5 | -16 | -22 | -28 | -23 | -16 |

ANNUAL MEAN -12

# MONTHLY AND YEARLY **Dst** 1957 - 1987

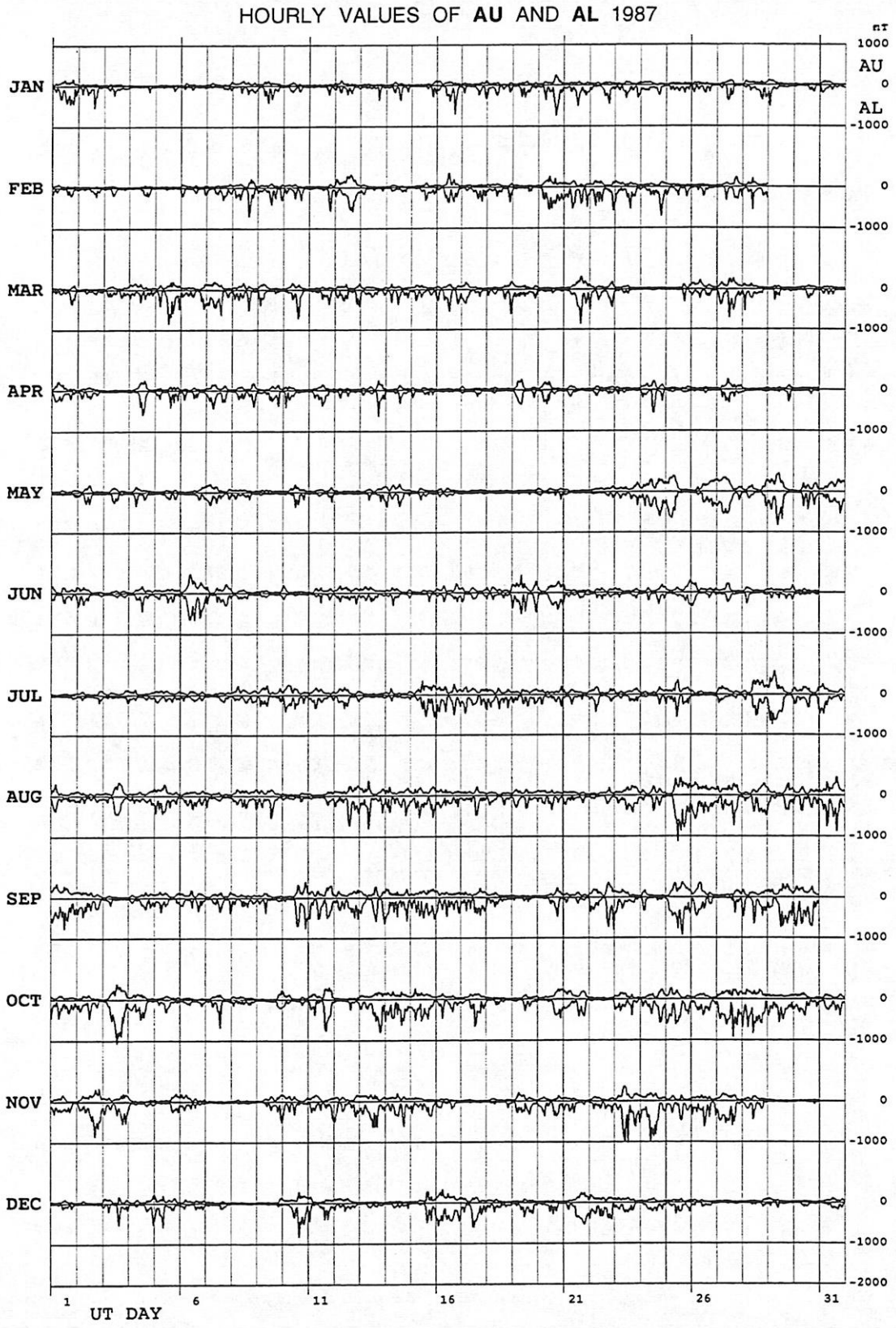
| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1957 | -19.8 | -24.1 | -41.3 | -27.8 | -5.2 | -10.0 | -11.7 | -3.5 | -64.0 | -14.4 | -20.7 | -18.5 | -21.7 |
| 1958 | -18.3 | -28.0 | -32.3 | -19.6 | -10.8 | -22.8 | -27.5 | -13.8 | -24.9 | -17.7 | -1.0 | -18.9 | -19.6 |
| 1959 | -10.5 | -31.5 | -25.1 | -22.6 | -14.3 | -6.5 | -35.6 | -32.0 | -39.2 | -25.3 | -35.1 | -30.1 | -25.7 |
| 1960 | -17.6 | -11.8 | -11.5 | -58.3 | -28.6 | -18.2 | -20.7 | -21.9 | -30.8 | -53.9 | -54.5 | -42.3 | -30.8 |
| 1961 | -17.2 | -21.5 | -13.6 | -11.8 | -7.0 | -6.5 | -28.3 | -7.2 | -8.8 | -28.3 | -17.5 | -10.9 | -14.9 |
| 1962 | -3.1 | -5.4 | .5 | -7.6 | 2.1 | .2 | 1.1 | -7.4 | -19.6 | -17.9 | -11.6 | -12.3 | -6.8 |
| 1963 | -6.1 | -2.2 | 1.8 | 2.0 | 1.1 | .0 | 1.9 | -4.2 | -29.5 | -23.3 | -15.4 | -7.9 | -6.8 |
| 1964 | -8.8 | -9.2 | -9.8 | -10.1 | -4.0 | -.2 | 1.9 | 2.3 | -.3 | -6.2 | -.2 | 6.1 | -3.2 |
| 1965 | 5.7 | -1.0 | .8 | -3.3 | 5.7 | .3 | 1.5 | 2.5 | -2.2 | 5.3 | 4.6 | 2.4 | 1.8 |
| 1966 | 4.2 | .1 | -8.2 | -1.6 | -3.3 | .2 | -3.2 | -2.1 | -25.1 | -10.7 | -8.1 | -13.9 | -6.0 |
| 1967 | -18.6 | -19.3 | -2.7 | -6.1 | -32.6 | -25.7 | -9.7 | -5.0 | -20.6 | -14.1 | -11.8 | -18.1 | -15.4 |
| 1968 | -20.4 | -26.8 | -20.8 | -13.9 | -12.6 | -13.0 | -5.4 | -6.2 | -11.8 | -16.6 | -32.5 | -13.7 | -16.1 |
| 1969 | -7.2 | -21.6 | -29.1 | -19.8 | -16.3 | -2.5 | 3.6 | -.3 | -8.3 | -10.8 | -4.1 | 2.3 | -9.5 |
| 1970 | -3.0 | .0 | -28.5 | -25.8 | -10.2 | -12.1 | -20.4 | -21.4 | -13.2 | -20.1 | -21.5 | -17.3 | -16.1 |
| 1971 | -15.0 | -17.9 | -15.0 | -26.6 | -17.1 | -8.7 | -3.5 | -9.4 | -16.8 | -15.6 | -14.9 | -24.2 | -15.4 |
| 1972 | -19.8 | -17.9 | -16.9 | -15.1 | -8.2 | -16.4 | -10.1 | -36.4 | -22.7 | -22.2 | -24.2 | -9.9 | -18.3 |
| 1973 | -12.8 | -20.4 | -23.9 | -46.3 | -17.0 | -10.1 | -1.3 | -2.9 | -10.8 | -13.7 | -7.3 | -.2 | -13.9 |
| 1974 | -4.2 | -5.6 | -16.3 | -13.7 | -8.4 | -5.7 | -26.5 | -13.3 | -20.8 | -23.0 | -17.1 | -12.0 | -13.9 |
| 1975 | -10.4 | -13.4 | -18.1 | -10.4 | -6.3 | .5 | -7.0 | -9.0 | -4.2 | -9.9 | -21.4 | -9.5 | -9.9 |
| 1976 | -12.3 | -11.3 | -24.1 | -24.6 | -13.2 | -4.4 | -5.7 | -7.5 | -12.2 | -16.2 | -14.9 | -16.1 | -13.5 |
| 1977 | -13.6 | -14.6 | -10.9 | -23.3 | -13.7 | -3.6 | -13.7 | -19.3 | -23.5 | -25.4 | -19.4 | -22.4 | -17.0 |
| 1978 | -19.4 | -26.1 | -28.1 | -30.8 | -34.5 | -14.9 | -9.2 | -12.1 | -27.0 | -22.7 | -27.4 | -13.9 | -22.2 |
| 1979 | -28.8 | -26.1 | -30.4 | -33.4 | -12.7 | -4.3 | 1.8 | -10.8 | -19.3 | -18.9 | -11.6 | -2.5 | -16.4 |
| 1980 | -13.1 | -18.5 | -3.1 | -9.4 | -6.6 | -11.7 | -6.6 | -4.3 | -4.8 | -22.2 | -18.1 | -19.9 | -11.5 |
| 1981 | -8.5 | -21.6 | -35.0 | -43.5 | -29.9 | -2.9 | -21.6 | -26.6 | -19.9 | -42.5 | -27.5 | -12.5 | -24.3 |
| 1982 | -3.9 | -50.0 | -18.8 | -25.0 | -2.7 | -12.5 | -31.0 | -23.4 | -47.8 | -23.9 | -26.1 | -20.1 | -23.8 |
| 1983 | -21.2 | -37.9 | -35.5 | -23.2 | -18.4 | -10.1 | -1.8 | -9.9 | -5.0 | -15.5 | -17.6 | -10.5 | -17.2 |
| 1984 | -7.5 | -18.5 | -26.1 | -24.8 | -17.5 | -10.8 | -9.5 | -12.3 | -22.6 | -22.2 | -20.5 | -16.4 | -17.4 |
| 1985 | -18.5 | -19.6 | -9.6 | -22.8 | -7.6 | -6.2 | -11.1 | -12.0 | -14.2 | -21.3 | -18.5 | -28.1 | -15.8 |
| 1986 | -15.5 | -44.9 | -26.0 | -11.4 | -12.4 | -2.7 | -1.7 | -10.9 | -23.2 | -13.5 | -18.8 | -9.0 | -15.8 |
| 1987 | -4.6 | -8.0 | -9.1 | -4.0 | -2.1 | -3.5 | -5.3 | -15.7 | -22.4 | -27.9 | -22.8 | -15.7 | -11.8 |

Unit : nT

# SECTION 3

## 3.5. AU, AL, AE INDICES


- Hourly values of **AU** and **AL** 1987 (graph) 103
- Monthly tables of hourly values of **AU**, **AL** and **AE** indices 104
- Monthly and yearly mean values of **AE** 1957-1987 128


HOURLY VALUES OF AU AND AL 1987
nT
1000
AU
0
AL
-1000
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
0
-1000
-2000
1
6
11
16
21
26
31
UT DAY

HOURLY VALUES (nT) OF AU, AL AND AE INDICES JANUARY 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 24 | 25 | 65 | 85 | 33 | 71 | 65 | 83 | 111 | 105 | 132 | 163 | 83 | 89 | 102 | 78 | 124 | 93 | 183 | 109 | 50 | 61 | 66 | 32 | 85 |
| | AL | -21 | -27 | -100 | -133 | -19 | -57 | -180 | -310 | -310 | -106 | -74 | -119 | -350 | -411 | -299 | -219 | -446 | -308 | -393 | -436 | -56 | -226 | -154 | -23 | -199 |
| | AE | 45 | 53 | 167 | 220 | 53 | 129 | 246 | 393 | 422 | 211 | 206 | 282 | 434 | 501 | 402 | 298 | 571 | 403 | 577 | 545 | 108 | 289 | 221 | 56 | 285 |
| 2 | | 28 | 33 | 36 | 61 | 26 | 29 | 31 | 42 | 39 | 33 | 44 | 26 | 49 | 30 | 54 | 52 | 55 | 35 | 23 | 20 | 31 | 19 | 31 | 27 | 36 |
| | | -11 | -13 | -40 | -187 | -6 | -8 | -14 | -105 | -207 | -127 | -145 | -64 | -60 | -64 | -530 | -291 | -260 | -89 | -19 | -29 | -36 | -20 | -8 | -7 | -97 |
| | | 40 | 48 | 78 | 250 | 33 | 38 | 46 | 148 | 247 | 161 | 190 | 91 | 109 | 95 | 585 | 344 | 316 | 125 | 43 | 51 | 69 | 40 | 40 | 35 | 134 |
| 3 | | 24 | 32 | 29 | 16 | 22 | 66 | 38 | 28 | 38 | 39 | 40 | 47 | 45 | 43 | 46 | 54 | 30 | 23 | 20 | 13 | 14 | 15 | 14 | 36 | 32 |
| | | -5 | -11 | -17 | -11 | -79 | -95 | -28 | -20 | -86 | -227 | -108 | -77 | -66 | -61 | -86 | -40 | -31 | -21 | -51 | -51 | -43 | -51 | -40 | -39 | -56 |
| | | 30 | 45 | 47 | 28 | 103 | 162 | 67 | 49 | 126 | 268 | 149 | 125 | 112 | 105 | 133 | 95 | 62 | 45 | 73 | 65 | 58 | 67 | 55 | 77 | 89 |
| 4 | | 21 | 15 | 22 | 18 | 17 | 12 | 11 | 13 | 19 | 19 | 15 | 14 | 16 | 18 | 14 | 12 | 12 | 15 | 6 | 18 | 14 | 11 | 10 | 12 | 15 |
| | | -19 | -16 | -8 | -9 | -5 | -3 | -3 | -3 | -10 | -11 | -4 | -4 | -12 | -7 | -5 | -7 | -13 | -22 | -151 | -51 | -21 | -15 | -11 | -14 | -18 |
| | | 42 | 33 | 31 | 28 | 24 | 17 | 15 | 17 | 30 | 31 | 20 | 18 | 29 | 26 | 20 | 20 | 25 | 38 | 158 | 70 | 36 | 27 | 22 | 27 | 34 |
| 5 | | 17 | 14 | 16 | 24 | 27 | 30 | 23 | 21 | 27 | 30 | 28 | 16 | 13 | 13 | 15 | 20 | 21 | 9 | 14 | 28 | 29 | 17 | 22 | 24 | 21 |
| | | -11 | -5 | -8 | -6 | -6 | -4 | -10 | -32 | -10 | -5 | 0 | -1 | -8 | -7 | -8 | -15 | -19 | -124 | -82 | -44 | -15 | -10 | -8 | -7 | -19 |
| | | 29 | 20 | 26 | 31 | 34 | 36 | 33 | 54 | 37 | 36 | 29 | 18 | 23 | 21 | 24 | 35 | 40 | 134 | 97 | 74 | 44 | 29 | 31 | 32 | 40 |
| 6 | | 17 | 16 | 23 | 37 | 80 | 60 | 41 | 33 | 31 | 30 | 38 | 45 | 31 | 26 | 15 | 11 | 23 | 23 | 16 | 16 | 14 | 14 | 20 | 32 | 29 |
| | | -4 | -8 | -15 | -78 | -10 | 0 | -2 | -6 | -3 | -1 | -90 | -68 | -7 | -3 | -6 | -14 | -22 | -17 | -12 | -5 | -3 | -23 | -46 | -34 | -20 |
| | | 23 | 25 | 39 | 117 | 92 | 60 | 44 | 40 | 35 | 32 | 128 | 114 | 40 | 31 | 23 | 26 | 46 | 41 | 29 | 22 | 17 | 38 | 67 | 67 | 50 |
| 7 | | 29 | 38 | 47 | 36 | 59 | 81 | 60 | 46 | 49 | 33 | 36 | 36 | 24 | 20 | 12 | 25 | 38 | 22 | 15 | 25 | 32 | 29 | 85 | 115 | 41 |
| | | -22 | -8 | -5 | -7 | -20 | -20 | 0 | 0 | 0 | -2 | -18 | -7 | -6 | -13 | -9 | -19 | -78 | -44 | -60 | -76 | -24 | -16 | -100 | -66 | -26 |
| | | 52 | 47 | 54 | 45 | 80 | 102 | 60 | 45 | 49 | 35 | 56 | 45 | 32 | 34 | 22 | 45 | 117 | 67 | 75 | 102 | 56 | 45 | 186 | 181 | 68 |
| 8 | | 91 | 59 | 55 | 54 | 53 | 67 | 62 | 90 | 100 | 118 | 129 | 72 | 54 | 83 | 108 | 67 | 54 | 29 | 29 | 63 | 89 | 67 | 32 | 29 | 69 |
| | | -48 | -8 | -6 | -23 | -11 | 0 | 0 | -4 | -174 | -76 | -25 | -7 | -22 | -44 | -202 | -125 | -86 | -79 | -54 | -122 | -143 | -163 | -96 | -60 | -66 |
| | | 141 | 68 | 63 | 78 | 65 | 66 | 61 | 95 | 276 | 195 | 155 | 80 | 77 | 128 | 310 | 193 | 140 | 108 | 84 | 187 | 233 | 231 | 129 | 90 | 136 |
| 9 | | 41 | 42 | 40 | 29 | 34 | 75 | 122 | 66 | 108 | 124 | 73 | 38 | 81 | 61 | 73 | 50 | 56 | 60 | 34 | 59 | 30 | 23 | 17 | 11 | 56 |
| | | -55 | -18 | -10 | -9 | -18 | -86 | -241 | -113 | -256 | -419 | -67 | -69 | -331 | -288 | -144 | -56 | -83 | -105 | -125 | -38 | -7 | -15 | -15 | -31 | -108 |
| | | 97 | 62 | 51 | 39 | 53 | 162 | 364 | 180 | 364 | 543 | 140 | 108 | 412 | 349 | 218 | 106 | 141 | 166 | 160 | 98 | 39 | 39 | 33 | 43 | 165 |
| 10 | | 15 | 14 | 15 | 13 | 30 | 41 | 58 | 50 | 106 | 70 | 57 | 37 | 20 | 26 | 49 | 33 | 26 | 10 | 16 | 19 | 20 | 20 | 21 | 16 | 33 |
| | | -8 | -13 | -8 | -6 | -10 | -48 | -108 | -117 | -162 | -93 | -70 | -21 | -27 | -29 | -122 | -128 | -71 | -23 | -13 | -10 | -10 | -22 | -13 | -9 | -48 |
| | | 25 | 28 | 24 | 20 | 42 | 90 | 167 | 168 | 269 | 164 | 128 | 60 | 47 | 56 | 172 | 162 | 98 | 34 | 30 | 30 | 31 | 43 | 35 | 27 | 81 |
| 11 | | 13 | 15 | 20 | 24 | 34 | 24 | 18 | 18 | 18 | 30 | 19 | 16 | 15 | 20 | 33 | 31 | 10 | 27 | 40 | 34 | 35 | 20 | 39 | 68 | 26 |
| | | -7 | -6 | -9 | -25 | -28 | -4 | -4 | -5 | 0 | -5 | -15 | -3 | -13 | -8 | -9 | -22 | -39 | -151 | -223 | -64 | 2 | -12 | -44 | -86 | -32 |
| | | 22 | 23 | 31 | 50 | 64 | 29 | 22 | 25 | 19 | 36 | 36 | 20 | 29 | 29 | 42 | 54 | 50 | 179 | 264 | 98 | 33 | 34 | 84 | 154 | 59 |
| 12 | | 62 | 35 | 52 | 56 | 87 | 145 | 106 | 48 | 50 | 40 | 54 | 65 | 27 | 14 | 29 | 42 | 35 | 24 | 43 | 11 | 15 | 15 | 20 | 21 | 46 |
| | | -86 | -17 | -4 | -21 | -142 | -159 | -38 | 0 | -31 | -45 | -82 | -218 | -71 | -32 | -120 | -186 | -108 | -27 | -11 | -17 | -13 | -16 | -49 | -79 | -65 |
| | | 148 | 53 | 57 | 78 | 231 | 306 | 145 | 48 | 81 | 86 | 137 | 283 | 99 | 47 | 149 | 228 | 143 | 52 | 55 | 29 | 29 | 32 | 70 | 101 | 112 |
| 13 | | 22 | 28 | 33 | 42 | 34 | 39 | 43 | 45 | 36 | 30 | 19 | 25 | 26 | 25 | 28 | 30 | 19 | 28 | 39 | 38 | 28 | 20 | 14 | 13 | 29 |
| | | -38 | -21 | -24 | -18 | -9 | -52 | -35 | -30 | -23 | -58 | -68 | -19 | -16 | -60 | -55 | -26 | -35 | -360 | -109 | -24 | 0 | -19 | -53 | -29 | -49 |
| | | 60 | 50 | 59 | 61 | 45 | 93 | 79 | 76 | 59 | 89 | 88 | 46 | 43 | 86 | 84 | 57 | 54 | 389 | 149 | 63 | 29 | 40 | 69 | 43 | 80 |
| 14 | | 15 | 19 | 23 | 23 | 29 | 38 | 38 | 62 | 99 | 84 | 45 | 35 | 44 | 53 | 51 | 33 | 29 | 18 | 11 | 9 | 35 | 23 | 19 | 13 | 35 |
| | | -13 | -33 | -41 | -33 | -16 | -20 | -24 | -142 | -175 | -56 | -27 | -49 | -218 | -353 | -120 | -37 | -11 | -27 | -19 | -56 | -148 | -13 | -10 | -7 | -69 |
| | | 30 | 53 | 66 | 57 | 46 | 59 | 63 | 205 | 275 | 141 | 73 | 86 | 263 | 406 | 172 | 71 | 41 | 46 | 30 | 67 | 184 | 38 | 30 | 22 | 105 |
| 15 | | 15 | 14 | 16 | 22 | 24 | 26 | 17 | 16 | 30 | 23 | 13 | 14 | 12 | 15 | 24 | 48 | 45 | 26 | 14 | 39 | 50 | 72 | 112 | 123 | 34 |
| | | -7 | -2 | -2 | -6 | -10 | -3 | -7 | -5 | -14 | -4 | -1 | -15 | -3 | -3 | -11 | -87 | -39 | -8 | -10 | -173 | -279 | -47 | -94 | -204 | -43 |
| | | 24 | 17 | 20 | 30 | 36 | 30 | 24 | 22 | 45 | 28 | 15 | 30 | 16 | 19 | 35 | 135 | 84 | 35 | 24 | 213 | 329 | 119 | 206 | 328 | 78 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 80 | 112 | 123 | 96 | 48 | 20 | 37 | 64 | 55 | 76 | 64 | 99 | 72 | 91 | 71 | 31 | 22 | 69 | 25 | 34 | 45 | 30 | 20 | 20 | 59 |
| | -101 | -112 | -99 | -32 | 0 | -1 | -8 | -24 | -42 | -239 | -241 | -207 | -386 | -277 | -142 | -63 | -163 | -692 | -432 | -232 | -69 | -23 | -29 | -23 | -152 |
| | 182 | 226 | 223 | 130 | 48 | 21 | 46 | 90 | 98 | 315 | 306 | 306 | 458 | 369 | 213 | 95 | 187 | 762 | 458 | 267 | 115 | 54 | 51 | 44 | 211 |
| 17 | 37 | 32 | 60 | 57 | 33 | 37 | 27 | 29 | 32 | 17 | 16 | 26 | 31 | 22 | 39 | 22 | 33 | 42 | 43 | 80 | 51 | 47 | 61 | 121 | 41 |
| | -29 | -42 | -189 | -105 | -10 | -11 | -5 | -9 | -20 | -19 | -15 | -31 | -26 | -24 | -84 | -106 | -239 | -147 | -105 | -35 | -13 | -35 | -214 | -324 | -76 |
| | 67 | 75 | 250 | 163 | 45 | 49 | 33 | 39 | 53 | 37 | 32 | 58 | 58 | 47 | 123 | 128 | 273 | 189 | 149 | 116 | 65 | 83 | 275 | 446 | 119 |
| 18 | 81 | 46 | 36 | 30 | 34 | 46 | 57 | 44 | 41 | 68 | 52 | 22 | 8 | 11 | 16 | 27 | 13 | 18 | 16 | 13 | 16 | 60 | 55 | 41 | 35 |
| | -191 | -59 | -53 | -67 | -31 | -36 | -60 | -92 | -184 | -252 | -174 | -28 | -12 | -14 | -25 | -98 | -67 | -32 | -9 | -9 | -18 | -172 | -125 | -49 | -77 |
| | 274 | 106 | 91 | 99 | 66 | 83 | 118 | 138 | 226 | 321 | 227 | 51 | 21 | 25 | 42 | 125 | 80 | 50 | 26 | 23 | 34 | 233 | 180 | 92 | 114 |
| 19 | 26 | 25 | 22 | 18 | 28 | 34 | 41 | 39 | 64 | 50 | 41 | 73 | 69 | 102 | 39 | 20 | 37 | 29 | 19 | 24 | 47 | 74 | 31 | 25 | 41 |
| | -19 | -9 | -25 | -14 | -6 | -19 | -37 | -96 | -281 | -113 | -63 | -301 | -214 | -147 | -116 | -183 | -112 | -28 | -9 | -40 | -30 | -85 | -24 | -22 | -83 |
| | 46 | 36 | 49 | 33 | 35 | 53 | 79 | 136 | 346 | 164 | 104 | 374 | 284 | 250 | 156 | 204 | 150 | 58 | 28 | 65 | 78 | 159 | 56 | 48 | 125 |
| 20 | 20 | 25 | 43 | 22 | 33 | 83 | 79 | 68 | 43 | 61 | 60 | 41 | 63 | 32 | 124 | 224 | 261 | 201 | 143 | 86 | 98 | 46 | 53 | 45 | 81 |
| | -16 | -41 | -49 | -14 | -29 | -193 | -355 | -124 | -24 | -60 | -157 | -164 | -118 | -49 | -351 | -479 | -740 | -573 | -395 | -217 | -117 | -195 | -132 | -52 | -193 |
| | 38 | 67 | 93 | 37 | 64 | 277 | 435 | 193 | 69 | 122 | 218 | 206 | 182 | 82 | 476 | 704 | 1002 | 774 | 538 | 304 | 216 | 242 | 186 | 98 | 276 |
| 21 | 34 | 41 | 39 | 39 | 35 | 49 | 59 | 47 | 49 | 61 | 37 | 57 | 67 | 92 | 51 | 49 | 30 | 17 | 23 | 34 | 43 | 75 | 55 | 32 | 46 |
| | -62 | -69 | -75 | -45 | -27 | -57 | -158 | -97 | -44 | -89 | -149 | -305 | -504 | -288 | -192 | -138 | -48 | -90 | -183 | -137 | -261 | -179 | -175 | -146 | -146 |
| | 98 | 112 | 116 | 86 | 63 | 107 | 218 | 146 | 95 | 150 | 186 | 362 | 571 | 380 | 244 | 188 | 78 | 108 | 207 | 171 | 305 | 255 | 230 | 179 | 194 |
| 22 | 32 | 45 | 34 | 29 | 24 | 44 | 41 | 62 | 51 | 32 | 18 | 25 | 36 | 49 | 27 | 85 | 41 | 58 | 78 | 59 | 47 | 52 | 29 | 49 | 44 |
| | -53 | -123 | -64 | -13 | -14 | -31 | -30 | -23 | -8 | -11 | -26 | -51 | -87 | -122 | -272 | -240 | -205 | -345 | -457 | -133 | -85 | -77 | -33 | -114 | -109 |
| | 86 | 169 | 99 | 43 | 40 | 77 | 72 | 86 | 60 | 44 | 45 | 77 | 123 | 171 | 300 | 326 | 247 | 404 | 537 | 194 | 132 | 130 | 62 | 164 | 154 |
| 23 | 26 | 29 | 29 | 48 | 21 | 25 | 17 | 26 | 19 | 61 | 90 | 62 | 77 | 66 | 57 | 21 | 35 | 20 | 21 | 17 | 23 | 55 | 34 | 71 | 40 |
| | -74 | -24 | -26 | -107 | -133 | -32 | -19 | -119 | -153 | -140 | -317 | -206 | -162 | -148 | -46 | -37 | -136 | -126 | -42 | -27 | -74 | -304 | -252 | -216 | -122 |
| | 100 | 54 | 55 | 156 | 155 | 58 | 37 | 146 | 173 | 202 | 407 | 269 | 240 | 214 | 104 | 59 | 171 | 148 | 64 | 45 | 98 | 360 | 287 | 288 | 162 |
| 24 | 53 | 55 | 41 | 69 | 64 | 68 | 65 | 68 | 85 | 60 | 46 | 41 | 27 | 18 | 8 | 8 | 4 | 34 | 14 | 31 | 22 | 12 | 15 | 9 | 38 |
| | -85 | -108 | -73 | -108 | -132 | -116 | -126 | -134 | -65 | -68 | -60 | -54 | -34 | -93 | -57 | -87 | -178 | -246 | -203 | -45 | -45 | -39 | -20 | -20 | -92 |
| | 139 | 165 | 116 | 179 | 198 | 185 | 192 | 203 | 152 | 129 | 107 | 96 | 62 | 111 | 66 | 95 | 183 | 281 | 217 | 78 | 68 | 53 | 36 | 30 | 131 |
| 25 | 9 | 8 | 25 | 26 | 31 | 36 | 44 | 44 | 17 | 44 | 37 | 37 | 43 | 26 | 24 | 19 | 14 | 52 | 39 | 23 | 30 | 33 | 33 | 15 | 29 |
| | -17 | -11 | -15 | -32 | -127 | -48 | -28 | -138 | -112 | -62 | -75 | -141 | -159 | -73 | -68 | -57 | -113 | -199 | -65 | -69 | -64 | -127 | -15 | -7 | -76 |
| | 27 | 20 | 41 | 60 | 159 | 85 | 73 | 183 | 130 | 107 | 113 | 179 | 202 | 100 | 92 | 77 | 128 | 252 | 105 | 94 | 95 | 162 | 49 | 24 | 106 |
| 26 | 13 | 25 | 54 | 62 | 36 | 50 | 50 | 46 | 54 | 23 | 38 | 27 | 13 | 25 | 53 | 12 | 7 | 15 | 19 | 13 | 13 | 9 | 9 | 9 | 28 |
| | -12 | -112 | -194 | -81 | -19 | -28 | -116 | -116 | -42 | -32 | -39 | -101 | -182 | -190 | -78 | -37 | -96 | -169 | -38 | -18 | -10 | -17 | -8 | -7 | -73 |
| | 26 | 139 | 250 | 145 | 57 | 80 | 168 | 162 | 96 | 55 | 78 | 129 | 195 | 216 | 131 | 51 | 104 | 185 | 58 | 32 | 25 | 27 | 18 | 17 | 102 |
| 27 | 10 | 8 | 9 | 23 | 41 | 44 | 35 | 62 | 40 | 81 | 73 | 108 | 104 | 112 | 86 | 17 | 19 | 13 | 16 | 15 | 15 | 13 | 15 | 9 | 40 |
| | -9 | -7 | -23 | -53 | -97 | -19 | -5 | -19 | -29 | -313 | -371 | -288 | -91 | -254 | -188 | -8 | -47 | -13 | -10 | -17 | -16 | -21 | -8 | -8 | -80 |
| | 19 | 15 | 33 | 78 | 139 | 65 | 42 | 82 | 70 | 395 | 444 | 397 | 196 | 366 | 275 | 26 | 67 | 27 | 28 | 33 | 32 | 36 | 24 | 18 | 121 |
| 28 | 15 | 32 | 87 | 109 | 78 | 62 | 55 | 62 | 64 | 56 | 79 | 33 | 51 | 45 | 52 | 40 | 22 | 89 | 42 | 41 | 36 | 52 | 63 | 91 | 57 |
| | -14 | -36 | -58 | -74 | -13 | -20 | -40 | -155 | -93 | -76 | -80 | -49 | -124 | -120 | -118 | -138 | -167 | -321 | -357 | -115 | -69 | -299 | -290 | -227 | -127 |
| | 31 | 69 | 145 | 184 | 93 | 83 | 96 | 218 | 158 | 133 | 160 | 84 | 176 | 165 | 171 | 178 | 190 | 411 | 401 | 157 | 106 | 352 | 353 | 319 | 185 |
| 29 | 120 | 125 | 103 | 97 | 97 | 87 | 54 | 59 | 47 | 22 | 30 | 43 | 29 | 15 | 8 | 10 | 4 | 11 | 8 | 14 | 11 | 11 | 16 | 8 | 43 |
| | -161 | -509 | -239 | -136 | -82 | -52 | -89 | -102 | -101 | -36 | -32 | -28 | -33 | -48 | -43 | -49 | -55 | -53 | -46 | -31 | -24 | -24 | -20 | -16 | -84 |
| | 283 | 636 | 344 | 234 | 180 | 140 | 144 | 161 | 149 | 59 | 62 | 72 | 64 | 63 | 52 | 59 | 60 | 65 | 55 | 47 | 36 | 36 | 37 | 25 | 128 |
| 30 | 21 | 29 | 27 | 10 | 7 | 3 | 6 | 7 | 10 | 15 | 17 | 14 | 18 | 15 | 9 | 18 | 23 | 11 | 9 | 15 | 20 | 24 | 20 | 25 | 16 |
| | -14 | -51 | -13 | -5 | -9 | -9 | -7 | -6 | -6 | -5 | -26 | -7 | -19 | -39 | -109 | -114 | -56 | -138 | -158 | -96 | -4 | -5 | -13 | -10 | -38 |
| | 35 | 82 | 41 | 17 | 17 | 14 | 15 | 14 | 17 | 22 | 44 | 23 | 38 | 55 | 118 | 133 | 80 | 150 | 168 | 112 | 24 | 30 | 34 | 36 | 55 |
| 31 | 26 | 53 | 79 | 63 | 108 | 84 | 72 | 82 | 79 | 72 | 62 | 37 | 26 | 13 | 25 | 16 | 12 | 11 | 13 | 9 | 18 | 17 | 13 | 24 | 42 |
| | -14 | -133 | -190 | -161 | -112 | -105 | -73 | -87 | -26 | -24 | -41 | -126 | -52 | -8 | -26 | -51 | -52 | -13 | -5 | -22 | -20 | -40 | -46 | -65 | -62 |
| | 40 | 187 | 270 | 226 | 222 | 189 | 146 | 169 | 106 | 97 | 104 | 164 | 79 | 22 | 52 | 68 | 65 | 25 | 20 | 32 | 39 | 58 | 60 | 89 | 105 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES FEBRUARY 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 31 | 33 | 44 | 55 | 53 | 97 | 72 | 48 | 37 | 27 | 37 | 19 | 14 | 32 | 46 | 19 | 17 | 19 | 23 | 19 | 36 | 29 | 24 | 30 | 36 |
| | AL | -169 | -81 | -30 | -34 | -106 | -62 | 2 | 4 | -2 | -5 | -25 | -7 | -5 | -21 | -156 | -53 | -166 | -207 | -133 | -51 | -26 | -22 | -30 | -63 | -60 |
| | AE | 202 | 114 | 75 | 89 | 160 | 161 | 69 | 43 | 39 | 33 | 62 | 27 | 19 | 54 | 202 | 72 | 185 | 228 | 158 | 72 | 64 | 52 | 55 | 94 | 97 |
| 2 | | 23 | 24 | 25 | 27 | 22 | 28 | 33 | 29 | 25 | 26 | 23 | 27 | 13 | 10 | 18 | 33 | 36 | 29 | 18 | 16 | 14 | 16 | 19 | 24 | 23 |
| | | -29 | -18 | -6 | -4 | -12 | -49 | -17 | 0 | -5 | -10 | -21 | -66 | -62 | -89 | -132 | -116 | -221 | -55 | -91 | -96 | -34 | -11 | -4 | -8 | -48 |
| | | 54 | 43 | 31 | 31 | 35 | 78 | 52 | 28 | 32 | 37 | 44 | 94 | 76 | 100 | 151 | 149 | 258 | 86 | 110 | 114 | 49 | 28 | 24 | 33 | 72 |
| 3 | | 25 | 30 | 31 | 31 | 35 | 43 | 34 | 58 | 32 | 51 | 29 | 18 | 11 | 9 | 6 | 8 | 8 | 6 | 10 | 10 | 11 | 13 | 17 | 14 | 22 |
| | | -35 | -16 | -13 | -3 | -9 | -4 | -15 | -104 | -193 | -173 | -118 | -59 | -15 | -13 | -9 | -21 | -22 | -13 | -17 | -52 | -23 | -7 | -9 | -5 | -39 |
| | | 61 | 47 | 46 | 34 | 45 | 48 | 50 | 163 | 226 | 225 | 148 | 79 | 27 | 23 | 16 | 30 | 31 | 20 | 29 | 63 | 35 | 20 | 27 | 20 | 63 |
| 4 | | 14 | 13 | 14 | 19 | 21 | 24 | 22 | 16 | 21 | 19 | 30 | 33 | 32 | 32 | 66 | 34 | 33 | 34 | 42 | 41 | 28 | 22 | 21 | 24 | 27 |
| | | -4 | -7 | -7 | -11 | -2 | -2 | 0 | -4 | -2 | -4 | -15 | -63 | -31 | -152 | -168 | -182 | -100 | -216 | -160 | -83 | -3 | -4 | -6 | -4 | -51 |
| | | 19 | 21 | 21 | 31 | 25 | 26 | 23 | 21 | 24 | 23 | 46 | 97 | 65 | 184 | 235 | 217 | 134 | 251 | 204 | 125 | 33 | 26 | 28 | 28 | 79 |
| 5 | | 23 | 19 | 20 | 21 | 21 | 23 | 26 | 20 | 24 | 32 | 41 | 21 | 16 | 17 | 17 | 28 | 30 | 19 | 18 | 16 | 16 | 20 | 21 | 22 | 22 |
| | | -4 | -1 | 0 | 0 | 0 | 0 | 0 | -1 | 0 | -6 | -48 | -21 | -13 | -5 | -3 | -7 | -22 | -2 | 1 | 0 | -20 | -4 | -6 | -27 | -8 |
| | | 28 | 21 | 20 | 21 | 21 | 24 | 26 | 22 | 25 | 39 | 91 | 43 | 30 | 23 | 20 | 36 | 53 | 21 | 16 | 16 | 37 | 25 | 28 | 50 | 31 |
| 6 | | 65 | 87 | 70 | 55 | 53 | 49 | 29 | 40 | 35 | 26 | 16 | 20 | 14 | 66 | 49 | 19 | 23 | 16 | 14 | 16 | 19 | 18 | 44 | 44 | 37 |
| | | -166 | -202 | -118 | -34 | -4 | -5 | -5 | -13 | -10 | -7 | -20 | -39 | -56 | -126 | -111 | -9 | -20 | -21 | -13 | -2 | -6 | -17 | -161 | -162 | -55 |
| | | 232 | 291 | 189 | 90 | 57 | 55 | 35 | 54 | 45 | 34 | 37 | 59 | 71 | 193 | 160 | 29 | 44 | 38 | 28 | 19 | 25 | 35 | 207 | 208 | 93 |
| 7 | | 46 | 29 | 24 | 22 | 27 | 20 | 21 | 31 | 39 | 46 | 62 | 41 | 34 | 53 | 58 | 34 | 61 | 28 | 55 | 37 | 49 | 94 | 75 | 52 | 43 |
| | | -94 | -36 | -26 | -24 | -23 | -2 | -3 | -34 | -126 | -131 | -160 | -47 | -32 | -104 | -160 | -297 | -196 | -205 | -163 | -19 | -51 | -116 | -135 | -133 | -96 |
| | | 141 | 66 | 50 | 46 | 51 | 22 | 25 | 65 | 166 | 177 | 222 | 90 | 67 | 157 | 219 | 332 | 259 | 234 | 220 | 57 | 101 | 211 | 212 | 186 | 141 |
| 8 | | 46 | 48 | 55 | 70 | 68 | 55 | 67 | 99 | 89 | 56 | 40 | 21 | 18 | 20 | 42 | 123 | 130 | 227 | 125 | 172 | 105 | 37 | 32 | 42 | 74 |
| | | -28 | -7 | -32 | -239 | -183 | -188 | -134 | -295 | -165 | -91 | -10 | -29 | -20 | -16 | -163 | -704 | -521 | -296 | -154 | -247 | -89 | -14 | -14 | -56 | -154 |
| | | 75 | 56 | 89 | 310 | 251 | 243 | 202 | 395 | 255 | 148 | 51 | 51 | 39 | 36 | 205 | 828 | 652 | 524 | 280 | 421 | 195 | 52 | 46 | 99 | 229 |
| 9 | | 35 | 33 | 66 | 48 | 72 | 39 | 38 | 57 | 36 | 52 | 56 | 88 | 109 | 84 | 40 | 39 | 37 | 48 | 21 | 24 | 35 | 42 | 80 | 71 | 52 |
| | | -124 | -58 | -66 | -92 | -78 | -6 | -23 | -58 | -106 | -60 | -103 | -308 | -419 | -121 | -53 | -220 | -262 | -41 | -9 | -8 | -18 | -287 | -314 | -195 | -126 |
| | | 160 | 93 | 133 | 141 | 150 | 46 | 62 | 115 | 142 | 112 | 160 | 396 | 528 | 206 | 93 | 259 | 300 | 90 | 32 | 33 | 54 | 330 | 396 | 267 | 179 |
| 10 | | 41 | 37 | 57 | 52 | 71 | 64 | 55 | 38 | 53 | 73 | 88 | 72 | 36 | 22 | 30 | 31 | 17 | 9 | 8 | 19 | 30 | 29 | 25 | 24 | 41 |
| | | -28 | -40 | -143 | -99 | -14 | -10 | -23 | -45 | -37 | -96 | -274 | -156 | -24 | -35 | -50 | -184 | -314 | -154 | -46 | -12 | -4 | -7 | -9 | -17 | -76 |
| | | 70 | 77 | 201 | 151 | 87 | 74 | 79 | 84 | 91 | 170 | 363 | 229 | 62 | 57 | 81 | 216 | 332 | 163 | 55 | 33 | 35 | 37 | 35 | 41 | 118 |
| 11 | | 33 | 22 | 19 | 26 | 24 | 23 | 21 | 28 | 32 | 33 | 19 | 19 | 22 | 20 | 22 | 34 | 19 | 24 | 72 | 86 | 59 | 27 | 39 | 53 | 32 |
| | | -32 | -25 | -22 | -24 | -3 | 0 | -1 | -4 | -2 | -16 | -10 | -7 | -54 | -53 | -14 | -17 | -9 | -103 | -411 | -571 | -180 | -41 | -41 | -55 | -71 |
| | | 66 | 49 | 42 | 51 | 27 | 24 | 23 | 33 | 35 | 49 | 29 | 26 | 77 | 73 | 36 | 52 | 29 | 128 | 484 | 659 | 240 | 69 | 81 | 109 | 104 |
| 12 | | 147 | 210 | 162 | 89 | 80 | 131 | 109 | 137 | 170 | 118 | 169 | 280 | 243 | 237 | 310 | 289 | 226 | 154 | 192 | 134 | 80 | 69 | 61 | 52 | 160 |
| | | -211 | -145 | -67 | -24 | -18 | -83 | -145 | -171 | -133 | -171 | -195 | -194 | -344 | -495 | -545 | -466 | -598 | -325 | -308 | -215 | -156 | -110 | -108 | -121 | -223 |
| | | 359 | 357 | 230 | 114 | 98 | 215 | 256 | 310 | 304 | 289 | 365 | 474 | 588 | 732 | 855 | 756 | 825 | 480 | 501 | 350 | 237 | 180 | 171 | 174 | 384 |
| 13 | | 42 | 71 | 55 | 64 | 48 | 39 | 39 | 18 | 13 | 15 | 13 | 15 | 25 | 7 | 13 | 13 | 15 | 12 | 12 | 14 | 18 | 16 | 20 | 23 | 26 |
| | | -63 | -104 | -158 | -156 | -51 | -9 | -24 | -29 | -12 | -10 | -13 | -14 | -66 | -25 | -8 | -12 | -11 | -10 | -9 | -13 | -83 | -19 | -5 | -3 | -38 |
| | | 107 | 176 | 214 | 220 | 100 | 49 | 64 | 47 | 25 | 26 | 27 | 30 | 92 | 33 | 23 | 26 | 27 | 24 | 22 | 29 | 102 | 36 | 26 | 26 | 65 |
| 14 | | 20 | 19 | 21 | 26 | 36 | 48 | 63 | 63 | 53 | 40 | 38 | 21 | 16 | 21 | 42 | 43 | 12 | 12 | 13 | 13 | 17 | 23 | 21 | 22 | 29 |
| | | -9 | -8 | -4 | -6 | -15 | -91 | -76 | -58 | -54 | -15 | -31 | -40 | -12 | -51 | -64 | -117 | -64 | -54 | -105 | -11 | -5 | -8 | 0 | -1 | -37 |
| | | 30 | 27 | 26 | 33 | 52 | 139 | 139 | 121 | 109 | 56 | 69 | 61 | 28 | 72 | 106 | 160 | 77 | 67 | 120 | 25 | 23 | 31 | 22 | 24 | 67 |
| 15 | | 20 | 19 | 20 | 23 | 38 | 37 | 34 | 39 | 39 | 34 | 49 | 40 | 46 | 86 | 122 | 57 | 23 | 18 | 36 | 27 | 31 | 53 | 59 | 35 | 41 |
| | | -3 | -5 | -4 | -22 | -16 | -22 | -11 | -7 | -45 | -92 | -103 | -51 | -68 | -326 | -286 | -126 | -119 | -140 | -124 | -98 | -45 | -166 | -135 | -27 | -85 |
| | | 24 | 24 | 24 | 47 | 54 | 59 | 45 | 46 | 85 | 127 | 154 | 92 | 115 | 413 | 409 | 184 | 143 | 159 | 162 | 126 | 77 | 221 | 195 | 62 | 127 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 42 | 45 | 46 | 43 | 33 | 25 | 38 | 50 | 59 | 90 | 194 | 354 | 295 | 78 | 49 | 124 | 198 | 83 | 59 | 88 | 57 | 42 | 32 | 25 | 90 |
| | -27 | -54 | -44 | -29 | -1 | 0 | -11 | -147 | -254 | -195 | -347 | -368 | -203 | -48 | -208 | -296 | -357 | -163 | -136 | -241 | -114 | -38 | -27 | -30 | -139 |
| | 71 | 101 | 92 | 73 | 34 | 23 | 50 | 198 | 315 | 287 | 541 | 722 | 499 | 126 | 257 | 420 | 557 | 247 | 196 | 330 | 171 | 81 | 60 | 55 | 229 |
| 17 | 34 | 25 | 28 | 28 | 42 | 37 | 48 | 44 | 46 | 26 | 32 | 33 | 32 | 30 | 25 | 36 | 54 | 30 | 61 | 51 | 30 | 37 | 43 | 39 | 37 |
| | -14 | -8 | -1 | -5 | -70 | -79 | -53 | -20 | -22 | -43 | -44 | -120 | -74 | -69 | -143 | -285 | -221 | -91 | -281 | -347 | -70 | -91 | -229 | -89 | -103 |
| | 49 | 34 | 30 | 34 | 113 | 116 | 102 | 65 | 69 | 70 | 77 | 154 | 107 | 99 | 168 | 322 | 276 | 122 | 344 | 399 | 101 | 129 | 273 | 129 | 141 |
| 18 | 66 | 56 | 43 | 50 | 47 | 65 | 62 | 44 | 56 | 85 | 56 | 64 | 49 | 39 | 27 | 22 | 15 | 18 | 15 | 14 | 28 | 46 | 74 | 84 | 47 |
| | -117 | -47 | -43 | -48 | -91 | -86 | -57 | -28 | -69 | -223 | -128 | -73 | -105 | -115 | -47 | -12 | -37 | -22 | -26 | -16 | -116 | -366 | -163 | -116 | -90 |
| | 185 | 104 | 87 | 98 | 140 | 152 | 120 | 72 | 126 | 309 | 185 | 137 | 154 | 155 | 75 | 35 | 53 | 42 | 43 | 32 | 145 | 414 | 238 | 202 | 138 |
| 19 | 44 | 39 | 29 | 45 | 43 | 37 | 30 | 19 | 31 | 24 | 19 | 15 | 17 | 17 | 25 | 34 | 34 | 28 | 16 | 16 | 19 | 23 | 26 | 26 | 27 |
| | -48 | -18 | -20 | -46 | -7 | -6 | -3 | -15 | -13 | -7 | -15 | -20 | -22 | -15 | -10 | -115 | -46 | -94 | -12 | -4 | -2 | -4 | -1 | 2 | -23 |
| | 93 | 57 | 49 | 91 | 52 | 45 | 34 | 35 | 45 | 33 | 34 | 36 | 40 | 33 | 36 | 149 | 81 | 124 | 30 | 21 | 21 | 28 | 27 | 23 | 51 |
| 20 | 23 | 35 | 27 | 49 | 86 | 121 | 140 | 156 | 172 | 125 | 263 | 158 | 114 | 86 | 71 | 216 | 108 | 39 | 87 | 90 | 110 | 82 | 77 | 96 | 105 |
| | 3 | -5 | -21 | -61 | -249 | -304 | -141 | -184 | -303 | -539 | -546 | -262 | -530 | -380 | -320 | -423 | -395 | -181 | -224 | -348 | -296 | -167 | -259 | -321 | -269 |
| | 19 | 41 | 49 | 110 | 336 | 425 | 282 | 342 | 476 | 664 | 810 | 421 | 644 | 467 | 392 | 640 | 504 | 221 | 312 | 440 | 407 | 250 | 337 | 418 | 375 |
| 21 | 86 | 97 | 65 | 77 | 63 | 56 | 106 | 125 | 146 | 140 | 69 | 14 | 15 | 15 | 19 | 67 | 37 | 25 | 17 | 29 | 45 | 67 | 54 | 79 | 63 |
| | -255 | -174 | -184 | -261 | -85 | -30 | -246 | -528 | -442 | -386 | -100 | -74 | -64 | -76 | -135 | -405 | -370 | -113 | -30 | -23 | -173 | -485 | -176 | -201 | -209 |
| | 341 | 272 | 250 | 339 | 149 | 87 | 353 | 653 | 590 | 528 | 169 | 89 | 81 | 92 | 155 | 473 | 408 | 139 | 48 | 53 | 219 | 553 | 231 | 280 | 273 |
| 22 | 74 | 57 | 45 | 48 | 123 | 157 | 103 | 115 | 109 | 86 | 147 | 90 | 80 | 51 | 23 | 34 | 26 | 28 | 27 | 28 | 29 | 60 | 122 | 101 | 73 |
| | -99 | -66 | -87 | -63 | -274 | -469 | -180 | -129 | -368 | -126 | -204 | -371 | -193 | -49 | -33 | -53 | -42 | -98 | -63 | -137 | -110 | -248 | -572 | -423 | -186 |
| | 175 | 125 | 133 | 112 | 399 | 627 | 284 | 245 | 478 | 213 | 352 | 463 | 273 | 101 | 56 | 88 | 69 | 127 | 91 | 167 | 140 | 310 | 695 | 525 | 260 |
| 23 | 125 | 132 | 96 | 95 | 79 | 57 | 101 | 83 | 59 | 33 | 50 | 59 | 37 | 58 | 107 | 75 | 66 | 46 | 69 | 58 | 42 | 30 | 24 | 35 | 67 |
| | -337 | -167 | -162 | -78 | -99 | -26 | -101 | -101 | -57 | -58 | -107 | -259 | -178 | -339 | -533 | -138 | -253 | -183 | -243 | -124 | -34 | -29 | -27 | -73 | -154 |
| | 462 | 301 | 259 | 174 | 178 | 84 | 203 | 184 | 117 | 92 | 158 | 319 | 215 | 397 | 641 | 214 | 320 | 231 | 313 | 183 | 78 | 61 | 52 | 110 | 223 |
| 24 | 36 | 34 | 34 | 34 | 48 | 41 | 60 | 40 | 45 | 79 | 67 | 53 | 50 | 30 | 21 | 19 | 30 | 24 | 82 | 106 | 119 | 86 | 84 | 62 | 53 |
| | -59 | -29 | -5 | -29 | -32 | -79 | -110 | -65 | -52 | -217 | -149 | -98 | -212 | -109 | -90 | -171 | -129 | -216 | -486 | -713 | -380 | -269 | -111 | -81 | -162 |
| | 96 | 65 | 39 | 64 | 80 | 121 | 171 | 105 | 98 | 298 | 217 | 151 | 263 | 140 | 111 | 191 | 160 | 241 | 569 | 820 | 501 | 356 | 196 | 143 | 217 |
| 25 | 83 | 60 | 53 | 42 | 40 | 43 | 53 | 61 | 38 | 31 | 44 | 38 | 42 | 25 | 22 | 31 | 27 | 16 | 20 | 41 | 26 | 25 | 30 | 31 | 38 |
| | -217 | -177 | -48 | -18 | -24 | -16 | -26 | -39 | -68 | -108 | -107 | -219 | -80 | -13 | -20 | -59 | -5 | -10 | -126 | -240 | -141 | -66 | -62 | -20 | -80 |
| | 301 | 238 | 103 | 61 | 64 | 59 | 80 | 101 | 107 | 140 | 151 | 258 | 124 | 39 | 42 | 90 | 32 | 27 | 147 | 282 | 169 | 93 | 93 | 52 | 119 |
| 26 | 32 | 32 | 25 | 26 | 30 | 31 | 40 | 41 | 38 | 25 | 51 | 41 | 37 | 21 | 30 | 25 | 21 | 18 | 20 | 22 | 19 | 22 | 23 | 28 | 29 |
| | -27 | -29 | -13 | -5 | -7 | -13 | -94 | -34 | -18 | -45 | -90 | -227 | -209 | -41 | -60 | -83 | -12 | -30 | -38 | -21 | -38 | -8 | -10 | -12 | -49 |
| | 60 | 62 | 39 | 32 | 38 | 45 | 135 | 76 | 57 | 70 | 142 | 269 | 247 | 63 | 92 | 108 | 34 | 49 | 60 | 44 | 59 | 30 | 34 | 41 | 79 |
| 27 | 26 | 28 | 26 | 26 | 34 | 46 | 49 | 65 | 90 | 99 | 67 | 52 | 36 | 58 | 65 | 40 | 167 | 230 | 235 | 127 | 86 | 65 | 47 | 48 | 76 |
| | -16 | -7 | -5 | 0 | 3 | -6 | -8 | -96 | -335 | -206 | -63 | -27 | -15 | -29 | -72 | -170 | -285 | -249 | -264 | -301 | -152 | -76 | -64 | -245 | -112 |
| | 44 | 36 | 31 | 27 | 30 | 53 | 57 | 163 | 426 | 306 | 131 | 80 | 52 | 88 | 137 | 211 | 453 | 481 | 500 | 430 | 240 | 142 | 112 | 294 | 188 |
| 28 | 34 | 37 | 33 | 26 | 46 | 110 | 59 | 57 | 74 | 216 | 88 | 116 | 84 | 52 | 53 | 38 | 26 | 26 | 29 | 63 | 40 | 40 | 55 | 66 | 61 |
| | -55 | -57 | -18 | -18 | -46 | -150 | -115 | -70 | -101 | -556 | -174 | -141 | -107 | -84 | -47 | -48 | -42 | -58 | -131 | -225 | -197 | -144 | -140 | -271 | -125 |
| | 90 | 96 | 53 | 44 | 93 | 261 | 175 | 127 | 176 | 773 | 263 | 257 | 191 | 136 | 100 | 87 | 69 | 85 | 161 | 289 | 238 | 186 | 196 | 339 | 187 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES — MARCH 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 41 | 46 | 39 | 47 | 36 | 22 | 48 | 47 | 36 | 29 | 19 | 46 | 17 | 15 | 18 | 23 | 18 | 53 | 79 | 88 | 120 | 48 | 28 | 16 | 41 |
| | AL | -34 | -17 | -9 | -75 | -47 | -18 | -23 | -95 | -92 | -68 | -20 | -48 | -82 | -52 | -18 | -23 | -115 | -339 | -355 | -200 | -250 | -78 | -14 | -13 | -87 |
| | AE | 75 | 64 | 48 | 122 | 83 | 41 | 72 | 143 | 129 | 98 | 41 | 96 | 100 | 68 | 37 | 47 | 134 | 393 | 436 | 289 | 370 | 127 | 42 | 30 | 129 |
| 2 | | 6 | 9 | 12 | 22 | 23 | 28 | 26 | 35 | 17 | 28 | 19 | 26 | 17 | 12 | 24 | 18 | 18 | 18 | 21 | 21 | 24 | 22 | 21 | 27 | 21 |
| | | -12 | -9 | -15 | -6 | -8 | -12 | -30 | -88 | -50 | -28 | -18 | -40 | -10 | -39 | -71 | -63 | -116 | -44 | -22 | -7 | -49 | -30 | -60 | -19 | -35 |
| | | 19 | 19 | 27 | 29 | 32 | 42 | 57 | 125 | 69 | 57 | 37 | 67 | 27 | 53 | 96 | 82 | 135 | 63 | 44 | 28 | 74 | 53 | 82 | 46 | 57 |
| 3 | | 21 | 17 | 30 | 51 | 53 | 60 | 87 | 84 | 95 | 53 | 50 | 43 | 24 | 22 | 32 | 36 | 28 | 39 | 36 | 77 | 42 | 43 | 74 | 70 | 49 |
| | | -3 | -3 | -12 | -106 | -162 | -55 | -155 | -141 | -81 | -37 | -102 | -94 | -11 | -7 | -9 | -73 | -186 | -168 | -31 | -122 | -118 | -74 | -80 | -116 | -81 |
| | | 25 | 20 | 42 | 157 | 216 | 115 | 243 | 227 | 178 | 91 | 154 | 139 | 36 | 30 | 42 | 109 | 215 | 209 | 68 | 200 | 161 | 117 | 156 | 187 | 131 |
| 4 | | 134 | 136 | 98 | 124 | 142 | 164 | 130 | 91 | 95 | 106 | 150 | 80 | 32 | 44 | 41 | 79 | 35 | 30 | 32 | 20 | 23 | 53 | 38 | 53 | 80 |
| | | -207 | -123 | -58 | -94 | -131 | -36 | -34 | -42 | -60 | -98 | -309 | -133 | -41 | -25 | -225 | -142 | -89 | -49 | -128 | -72 | -23 | -146 | -54 | -65 | -99 |
| | | 342 | 260 | 156 | 219 | 273 | 201 | 164 | 134 | 156 | 206 | 460 | 215 | 75 | 70 | 268 | 222 | 125 | 80 | 161 | 93 | 48 | 201 | 93 | 120 | 181 |
| 5 | | 36 | 22 | 33 | 56 | 117 | 117 | 45 | 30 | 46 | 50 | 65 | 103 | 103 | 98 | 187 | 85 | 205 | 133 | 113 | 105 | 85 | 76 | 113 | 68 | 87 |
| | | -20 | -16 | -30 | -117 | -401 | -236 | -26 | -9 | -19 | -98 | -171 | -326 | -841 | -592 | -678 | -277 | -577 | -412 | -221 | -156 | -136 | -136 | -478 | -156 | -255 |
| | | 58 | 39 | 63 | 174 | 519 | 353 | 72 | 41 | 66 | 150 | 237 | 431 | 945 | 691 | 866 | 363 | 783 | 546 | 334 | 262 | 221 | 212 | 591 | 225 | 344 |
| 6 | | 48 | 56 | 44 | 49 | 41 | 32 | 59 | 63 | 53 | 32 | 69 | 43 | 42 | 27 | 22 | 30 | 19 | 16 | 23 | 46 | 57 | 66 | 131 | 140 | 50 |
| | | -42 | -174 | -129 | -100 | -51 | -54 | -128 | -131 | -41 | -34 | -155 | -173 | -105 | -26 | -6 | -8 | -25 | -16 | -95 | -279 | -196 | -473 | -407 | -322 | -132 |
| | | 90 | 231 | 174 | 150 | 93 | 86 | 188 | 195 | 94 | 68 | 226 | 218 | 149 | 55 | 30 | 39 | 45 | 33 | 119 | 326 | 253 | 540 | 539 | 463 | 183 |
| 7 | | 121 | 143 | 111 | 133 | 118 | 102 | 178 | 199 | 161 | 161 | 136 | 100 | 102 | 137 | 94 | 44 | 28 | 31 | 30 | 32 | 33 | 43 | 29 | 36 | 96 |
| | | -371 | -308 | -385 | -173 | -196 | -217 | -330 | -429 | -437 | -276 | -273 | -200 | -410 | -631 | -295 | -18 | -16 | -16 | -58 | -168 | -176 | -76 | -30 | -51 | -231 |
| | | 492 | 451 | 496 | 307 | 314 | 320 | 509 | 630 | 600 | 439 | 411 | 302 | 513 | 769 | 390 | 62 | 45 | 47 | 89 | 201 | 211 | 120 | 60 | 88 | 328 |
| 8 | | 33 | 52 | 61 | 42 | 38 | 62 | 90 | 85 | 96 | 108 | 172 | 101 | 31 | 27 | 47 | 101 | 75 | 56 | 43 | 34 | 29 | 38 | 33 | 36 | 62 |
| | | -12 | -120 | -227 | -105 | -71 | -177 | -261 | -66 | -109 | -203 | -174 | -36 | -26 | -38 | -199 | -509 | -289 | -66 | -19 | -23 | -30 | -37 | -45 | -9 | -119 |
| | | 45 | 172 | 289 | 147 | 110 | 240 | 352 | 153 | 207 | 313 | 347 | 139 | 58 | 67 | 246 | 611 | 366 | 123 | 63 | 57 | 59 | 77 | 78 | 46 | 182 |
| 9 | | 39 | 79 | 108 | 124 | 108 | 151 | 128 | 109 | 69 | 55 | 36 | 24 | 21 | 24 | 36 | 37 | 31 | 40 | 24 | 20 | 23 | 17 | 18 | 34 | 57 |
| | | -12 | -159 | -392 | -190 | -229 | -214 | -70 | -52 | -26 | -14 | -20 | -12 | -18 | -19 | -18 | -34 | -89 | -45 | -39 | -54 | -18 | -10 | -14 | -19 | -74 |
| | | 52 | 238 | 501 | 315 | 338 | 366 | 199 | 162 | 96 | 70 | 57 | 38 | 41 | 44 | 55 | 71 | 121 | 85 | 64 | 74 | 42 | 27 | 33 | 54 | 131 |
| 10 | | 21 | 24 | 39 | 38 | 57 | 59 | 73 | 114 | 159 | 135 | 69 | 48 | 87 | 91 | 134 | 62 | 69 | 41 | 32 | 31 | 24 | 19 | 17 | 16 | 61 |
| | | -13 | -25 | -42 | -23 | -84 | -63 | -53 | -70 | -236 | -201 | -87 | -97 | -370 | -713 | -633 | -193 | -144 | -109 | -30 | -12 | -6 | -6 | -7 | -8 | -134 |
| | | 35 | 50 | 82 | 62 | 142 | 123 | 127 | 185 | 397 | 338 | 158 | 147 | 458 | 806 | 769 | 256 | 213 | 150 | 62 | 44 | 30 | 26 | 25 | 24 | 196 |
| 11 | | 14 | 24 | 27 | 28 | 24 | 25 | 40 | 40 | 27 | 32 | 32 | 55 | 75 | 44 | 36 | 23 | 20 | 30 | 65 | 43 | 41 | 31 | 31 | 27 | 35 |
| | | -7 | -16 | -26 | -44 | -7 | -16 | -54 | -30 | -75 | -28 | -22 | -92 | -242 | -110 | -154 | -162 | -125 | -230 | -368 | -189 | -51 | -7 | -6 | -12 | -86 |
| | | 21 | 41 | 53 | 73 | 32 | 42 | 95 | 71 | 103 | 62 | 55 | 148 | 319 | 155 | 190 | 185 | 146 | 262 | 435 | 233 | 93 | 39 | 38 | 39 | 122 |
| 12 | | 23 | 49 | 86 | 65 | 70 | 72 | 71 | 78 | 75 | 87 | 140 | 56 | 28 | 27 | 32 | 27 | 20 | 21 | 31 | 31 | 70 | 70 | 114 | 150 | 62 |
| | | -30 | -140 | -196 | -131 | -27 | -132 | -121 | -250 | -281 | -124 | -179 | -214 | -18 | -33 | -10 | -44 | -71 | -13 | -43 | -41 | -354 | -210 | -355 | -418 | -143 |
| | | 53 | 190 | 283 | 196 | 97 | 205 | 192 | 329 | 357 | 212 | 320 | 272 | 47 | 60 | 43 | 72 | 91 | 34 | 76 | 73 | 425 | 282 | 470 | 569 | 206 |
| 13 | | 71 | 49 | 37 | 36 | 39 | 61 | 65 | 66 | 61 | 55 | 55 | 64 | 57 | 44 | 35 | 34 | 26 | 20 | 16 | 16 | 18 | 29 | 42 | 69 | 44 |
| | | -96 | -29 | -19 | -43 | -88 | -113 | -89 | -64 | -107 | -82 | -189 | -171 | -139 | -57 | -70 | -117 | -18 | -25 | -18 | -7 | -9 | -45 | -134 | -114 | -77 |
| | | 167 | 79 | 57 | 80 | 128 | 174 | 154 | 131 | 169 | 139 | 245 | 237 | 197 | 102 | 106 | 152 | 44 | 45 | 34 | 24 | 28 | 74 | 178 | 184 | 122 |
| 14 | | 54 | 30 | 42 | 49 | 66 | 140 | 48 | 60 | 46 | 40 | 67 | 72 | 75 | 68 | 27 | 28 | 24 | 26 | 33 | 31 | 47 | 44 | 38 | 45 | 50 |
| | | -63 | -16 | -13 | -38 | -113 | -323 | -121 | -9 | -17 | -18 | -115 | -374 | -214 | -135 | -32 | -18 | -38 | -154 | -82 | -68 | -204 | -102 | -15 | -19 | -96 |
| | | 118 | 46 | 55 | 88 | 180 | 463 | 170 | 70 | 64 | 59 | 184 | 448 | 290 | 204 | 61 | 48 | 63 | 181 | 117 | 100 | 252 | 147 | 54 | 65 | 147 |
| 15 | | 56 | 41 | 55 | 52 | 100 | 108 | 89 | 69 | 67 | 106 | 89 | 42 | 66 | 59 | 44 | 28 | 32 | 26 | 43 | 33 | 25 | 33 | 40 | 45 | 56 |
| | | -64 | -29 | -13 | -96 | -274 | -202 | -76 | -15 | -60 | -196 | -162 | -84 | -55 | -70 | -7 | -12 | -22 | -59 | -140 | -109 | -89 | -17 | -27 | -107 | -83 |
| | | 121 | 71 | 69 | 148 | 374 | 311 | 166 | 85 | 128 | 304 | 252 | 127 | 122 | 131 | 52 | 41 | 55 | 86 | 184 | 143 | 115 | 50 | 68 | 152 | 140 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 60 | 59 | 63 | 31 | 24 | 30 | 58 | 68 | 50 | 61 | 97 | 111 | 104 | 120 | 42 | 40 | 33 | 26 | 22 | 39 | 80 | 79 | 73 | 50 | 59 |
| | -230 | -280 | -94 | -10 | -5 | -9 | -40 | -264 | -177 | -201 | -217 | -449 | -553 | -249 | -53 | -8 | -6 | -13 | -18 | -170 | -368 | -322 | -214 | -98 | -169 |
| | 290 | 340 | 158 | 41 | 29 | 40 | 98 | 333 | 227 | 264 | 316 | 562 | 658 | 371 | 95 | 49 | 39 | 40 | 41 | 211 | 449 | 402 | 288 | 149 | 229 |
| 17 | 68 | 94 | 84 | 117 | 178 | 123 | 128 | 74 | 47 | 40 | 47 | 43 | 46 | 66 | 32 | 29 | 23 | 21 | 27 | 18 | 16 | 16 | 15 | 20 | 57 |
| | -191 | -229 | -290 | -323 | -345 | -184 | -201 | -135 | -33 | -50 | -19 | -15 | -24 | -84 | -68 | -39 | -61 | -181 | -52 | -49 | -10 | -26 | -15 | -17 | -110 |
| | 260 | 324 | 374 | 441 | 524 | 307 | 329 | 211 | 81 | 92 | 68 | 59 | 71 | 152 | 102 | 70 | 85 | 204 | 80 | 69 | 27 | 43 | 31 | 37 | 168 |
| 18 | 30 | 37 | 27 | 27 | 24 | 26 | 35 | 56 | 36 | 35 | 27 | 22 | 34 | 22 | 40 | 36 | 50 | 92 | 55 | 95 | 63 | 90 | 175 | 193 | 55 |
| | -22 | -156 | -72 | -11 | -17 | -35 | -87 | -115 | -115 | -47 | -19 | -15 | -22 | -16 | -10 | -26 | -203 | -247 | -101 | -48 | -23 | -162 | -611 | -462 | -110 |
| | 53 | 193 | 100 | 38 | 41 | 61 | 123 | 172 | 153 | 83 | 47 | 37 | 57 | 38 | 51 | 64 | 254 | 340 | 157 | 145 | 87 | 253 | 786 | 655 | 166 |
| 19 | 150 | 114 | 81 | 66 | 60 | 43 | 64 | 42 | 68 | 74 | 61 | 108 | 30 | 41 | 45 | 35 | 21 | 13 | 14 | 22 | 54 | 81 | 66 | 46 | 58 |
| | -208 | -150 | -86 | -203 | -135 | -108 | -177 | -68 | -130 | -116 | -68 | -181 | -111 | -102 | -126 | -55 | -55 | -73 | -87 | -71 | -166 | -226 | -114 | -26 | -118 |
| | 358 | 264 | 167 | 269 | 195 | 152 | 242 | 112 | 199 | 191 | 130 | 291 | 142 | 144 | 172 | 91 | 77 | 88 | 101 | 94 | 221 | 308 | 181 | 72 | 178 |
| 20 | 29 | 23 | 18 | 18 | 21 | 21 | 27 | 24 | 34 | 21 | 24 | 22 | 14 | 17 | 14 | 19 | 28 | 20 | 18 | 17 | 23 | 31 | 25 | 33 | 23 |
| | -57 | -32 | -15 | -24 | -37 | -38 | -51 | -38 | -30 | -42 | -40 | -32 | -25 | -99 | -71 | -32 | -27 | -14 | -11 | -20 | -22 | -52 | -40 | -34 | -37 |
| | 87 | 55 | 33 | 42 | 59 | 60 | 79 | 63 | 65 | 64 | 65 | 55 | 39 | 118 | 87 | 52 | 57 | 35 | 29 | 39 | 46 | 84 | 66 | 68 | 60 |
| 21 | 29 | 21 | 26 | 39 | 31 | 26 | 55 | 59 | 104 | 77 | 103 | 164 | 144 | 203 | 169 | 293 | 294 | 180 | 127 | 199 | 166 | 118 | 63 | 119 | 117 |
| | -18 | -27 | -27 | -44 | -30 | -42 | -118 | -146 | -110 | -93 | -152 | -230 | -419 | -429 | -473 | -863 | -510 | -178 | -104 | -208 | -362 | -286 | -90 | -306 | -219 |
| | 48 | 49 | 54 | 83 | 61 | 69 | 173 | 206 | 216 | 171 | 256 | 396 | 564 | 633 | 643 | 1157 | 806 | 359 | 232 | 408 | 530 | 404 | 154 | 425 | 337 |
| 22 | 106 | 60 | 37 | 61 | 26 | 17 | 36 | 41 | 75 | 42 | 54 | 37 | 60 | 19 | 28 | 15 | 49 | 39 | 72 | 105 | 140 | 182 | 93 | 55 | 60 |
| | -497 | -159 | -62 | -81 | -30 | -12 | -45 | -141 | -273 | -195 | -167 | -66 | -90 | -37 | -58 | -26 | -62 | -141 | -225 | -216 | -376 | -442 | -229 | -92 | -155 |
| | 604 | 219 | 99 | 144 | 57 | 31 | 81 | 183 | 349 | 238 | 222 | 104 | 152 | 56 | 87 | 42 | 112 | 181 | 298 | 322 | 518 | 624 | 323 | 149 | 216 |
| 23 | 31 | 24 | 24 | 30 | 26 | 26 | 32 | 46 | 54 | 56 | 51 | 76 | 75 | 28 | 33 | 12 | 14 | 21 | 15 | 15 | 11 | 15 | 11 | 11 | 31 |
| | -35 | -45 | -33 | -39 | -25 | -11 | -17 | -58 | -104 | -84 | -35 | -86 | -120 | -34 | -21 | -21 | -12 | -17 | -21 | -13 | -9 | -11 | -16 | -17 | -37 |
| | 67 | 70 | 58 | 69 | 52 | 38 | 50 | 106 | 158 | 141 | 88 | 163 | 196 | 64 | 56 | 35 | 28 | 39 | 38 | 30 | 21 | 26 | 27 | 28 | 69 |
| 24 | 12 | 12 | 16 | 16 | 17 | 18 | 20 | 24 | 35 | 19 | 16 | 16 | 17 | 20 | 18 | 17 | 20 | 20 | 14 | 21 | 26 | 21 | 22 | 14 | 19 |
| | -12 | -12 | -9 | -9 | -9 | -4 | -2 | -6 | -10 | -18 | -21 | -25 | -22 | -21 | -13 | -8 | -7 | -5 | -2 | -6 | -16 | -8 | -11 | -13 | -11 |
| | 25 | 25 | 26 | 26 | 26 | 23 | 23 | 31 | 46 | 38 | 38 | 42 | 40 | 41 | 31 | 27 | 28 | 26 | 16 | 28 | 42 | 30 | 34 | 28 | 31 |
| 25 | 13 | 13 | 14 | 14 | 15 | 16 | 17 | 18 | 18 | 19 | 19 | 19 | 22 | 24 | 15 | 35 | 98 | 103 | 35 | 30 | 26 | 29 | 92 | 75 | 32 |
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| | 27 | 30 | 29 | 37 | 33 | 27 | 27 | 32 | 31 | 37 | 42 | 43 | 43 | 42 | 30 | 55 | 246 | 424 | 83 | 49 | 43 | 45 | 183 | 164 | 75 |
| 26 | 128 | 136 | 140 | 89 | 93 | 116 | 116 | 129 | 219 | 152 | 101 | 86 | 32 | 56 | 21 | 62 | 96 | 90 | 61 | 43 | 37 | 32 | 30 | 35 | 87 |
| | -165 | -153 | -89 | -33 | -31 | -102 | -83 | -133 | -237 | -101 | -44 | -40 | -13 | -58 | -153 | -175 | -115 | -178 | -115 | -11 | -34 | -44 | -31 | -20 | -90 |
| | 293 | 290 | 229 | 122 | 124 | 218 | 199 | 263 | 457 | 254 | 146 | 128 | 46 | 115 | 176 | 238 | 212 | 270 | 178 | 55 | 72 | 77 | 62 | 55 | 178 |
| 27 | 38 | 49 | 83 | 116 | 165 | 144 | 70 | 95 | 57 | 57 | 105 | 236 | 253 | 149 | 193 | 265 | 176 | 119 | 138 | 89 | 71 | 93 | 61 | 55 | 120 |
| | -26 | -115 | -248 | -388 | -361 | -261 | -114 | -135 | -69 | -7 | -112 | -702 | -459 | -250 | -375 | -534 | -436 | -187 | -184 | -116 | -64 | -180 | -151 | -50 | -230 |
| | 65 | 164 | 331 | 505 | 526 | 406 | 185 | 230 | 127 | 66 | 219 | 939 | 714 | 401 | 569 | 800 | 614 | 307 | 323 | 206 | 137 | 275 | 213 | 106 | 351 |
| 28 | 65 | 112 | 111 | 77 | 73 | 51 | 88 | 57 | 135 | 96 | 54 | 54 | 53 | 63 | 33 | 33 | 28 | 24 | 21 | 38 | 30 | 24 | 23 | 17 | 57 |
| | -48 | -172 | -541 | -176 | -86 | -65 | -109 | -190 | -214 | -227 | -140 | -86 | -123 | -139 | -114 | -92 | -90 | -78 | -110 | -35 | -14 | -8 | -15 | -18 | -120 |
| | 113 | 284 | 653 | 253 | 160 | 116 | 197 | 248 | 351 | 324 | 195 | 142 | 177 | 204 | 148 | 126 | 120 | 103 | 133 | 74 | 45 | 32 | 38 | 35 | 178 |
| 29 | 15 | 17 | 15 | 21 | 24 | 32 | 73 | 35 | 48 | 60 | 58 | 32 | 26 | 19 | 19 | 15 | 13 | 20 | 23 | 24 | 27 | 24 | 21 | 18 | 28 |
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| | 34 | 31 | 30 | 37 | 42 | 49 | 349 | 104 | 201 | 177 | 239 | 81 | 42 | 39 | 47 | 57 | 47 | 33 | 39 | 54 | 73 | 89 | 44 | 47 | 83 |
| 30 | 17 | 18 | 25 | 23 | 25 | 31 | 26 | 41 | 41 | 35 | 34 | 48 | 41 | 84 | 84 | 37 | 63 | 58 | 57 | 50 | 36 | 21 | 16 | 21 | 39 |
| | -32 | -29 | -47 | -24 | -18 | -13 | -12 | -15 | -36 | -24 | -19 | -62 | -127 | -232 | -220 | -126 | -168 | -141 | -50 | -5 | -25 | -12 | -18 | -20 | -61 |
| | 49 | 47 | 73 | 47 | 43 | 45 | 38 | 56 | 78 | 60 | 55 | 112 | 170 | 318 | 305 | 165 | 232 | 200 | 108 | 56 | 62 | 35 | 35 | 41 | 101 |
| 31 | 21 | 24 | 30 | 39 | 53 | 43 | 46 | 63 | 49 | 38 | 54 | 52 | 37 | 36 | 25 | 33 | 23 | 18 | 21 | 20 | 20 | 22 | 28 | 27 | 34 |
| | -21 | -21 | -57 | -113 | -115 | -10 | -15 | -54 | -141 | -66 | -31 | -46 | -139 | -105 | -28 | -10 | -18 | -10 | -3 | -22 | -9 | -13 | -16 | -17 | -45 |
| | 43 | 45 | 88 | 152 | 168 | 53 | 62 | 118 | 191 | 105 | 87 | 100 | 178 | 142 | 55 | 45 | 42 | 28 | 25 | 43 | 30 | 36 | 44 | 45 | 80 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES APRIL 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 26 | 44 | 80 | 124 | 107 | 213 | 227 | 164 | 143 | 116 | 164 | 61 | 80 | 74 | 24 | 32 | 40 | 56 | 24 | 36 | 49 | 23 | 22 | 13 | 81 |
| | AL | -18 | -54 | -178 | -243 | -257 | -222 | -181 | -115 | -229 | -217 | -127 | -82 | -44 | -66 | -58 | -49 | -107 | -201 | -65 | -19 | -79 | -14 | -14 | -24 | -111 |
| | AE | 45 | 99 | 259 | 368 | 364 | 435 | 409 | 279 | 373 | 334 | 291 | 143 | 125 | 140 | 83 | 82 | 149 | 258 | 90 | 57 | 130 | 39 | 37 | 37 | 193 |
| 2 | | 11 | 13 | 35 | 38 | 55 | 47 | 31 | 57 | 62 | 79 | 91 | 67 | 64 | 45 | 58 | 32 | 15 | 39 | 21 | 13 | 21 | 18 | 15 | 13 | 39 |
| | | -31 | -30 | -70 | -182 | -137 | -22 | -22 | -35 | -131 | -131 | -115 | -198 | -133 | -42 | -40 | -35 | -44 | -110 | -90 | -42 | -4 | -9 | -16 | -18 | -70 |
| | | 42 | 44 | 107 | 221 | 193 | 71 | 54 | 93 | 194 | 210 | 206 | 265 | 198 | 88 | 99 | 68 | 60 | 150 | 113 | 57 | 25 | 28 | 32 | 33 | 111 |
| 3 | | 11 | 10 | 6 | 5 | 5 | 9 | 10 | 11 | 14 | 23 | 16 | 19 | 17 | 12 | 11 | 7 | 8 | 12 | 12 | 9 | 12 | 12 | 13 | 16 | 12 |
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| | | 33 | 32 | 24 | 22 | 23 | 30 | 29 | 26 | 27 | 39 | 37 | 41 | 34 | 28 | 24 | 16 | 20 | 24 | 26 | 25 | 23 | 25 | 28 | 40 | 28 |
| 4 | | 17 | 9 | 6 | 30 | 25 | 45 | 60 | 61 | 74 | 141 | 184 | 213 | 178 | 172 | 259 | 180 | 67 | 42 | 30 | 22 | 24 | 18 | 21 | 20 | 79 |
| | | -25 | -23 | -17 | -13 | -10 | -17 | -25 | -20 | -37 | -123 | -385 | -275 | -593 | -558 | -369 | -139 | -92 | -25 | -2 | -1 | -5 | -11 | -16 | -19 | -117 |
| | | 43 | 32 | 25 | 44 | 35 | 63 | 85 | 82 | 112 | 265 | 570 | 488 | 771 | 730 | 629 | 320 | 160 | 68 | 33 | 24 | 30 | 29 | 38 | 41 | 196 |
| 5 | | 18 | 23 | 50 | 45 | 46 | 72 | 14 | 32 | 14 | 26 | 30 | 21 | 31 | 81 | 94 | 44 | 46 | 97 | 50 | 40 | 92 | 85 | 39 | 23 | 46 |
| | | -14 | -98 | -83 | -95 | -202 | -90 | -31 | -28 | -20 | -29 | -27 | -22 | -33 | -158 | -417 | -158 | -78 | -296 | -74 | -64 | -142 | -245 | -31 | -38 | -103 |
| | | 33 | 121 | 133 | 141 | 249 | 164 | 45 | 61 | 35 | 56 | 58 | 44 | 65 | 240 | 512 | 203 | 126 | 394 | 126 | 104 | 236 | 332 | 71 | 62 | 150 |
| 6 | | 25 | 19 | 32 | 45 | 44 | 38 | 20 | 9 | 10 | 12 | 27 | 60 | 83 | 60 | 33 | 27 | 38 | 24 | 21 | 20 | 16 | 20 | 44 | 44 | 32 |
| | | -21 | -19 | -76 | -225 | -120 | -17 | -13 | -11 | -11 | -14 | -19 | -50 | -187 | -145 | -67 | -162 | -79 | -18 | -8 | -19 | -24 | -12 | -36 | -79 | -60 |
| | | 47 | 40 | 109 | 270 | 166 | 57 | 34 | 21 | 22 | 28 | 47 | 111 | 271 | 205 | 100 | 190 | 117 | 43 | 30 | 40 | 40 | 32 | 81 | 125 | 93 |
| 7 | | 61 | 46 | 54 | 65 | 51 | 140 | 133 | 140 | 157 | 71 | 46 | 49 | 37 | 42 | 51 | 54 | 112 | 132 | 76 | 34 | 31 | 24 | 19 | 18 | 68 |
| | | -82 | -116 | -206 | -248 | -157 | -285 | -433 | -334 | -151 | -108 | -55 | -53 | -36 | -42 | -103 | -279 | -218 | -276 | -96 | -11 | -4 | -5 | -10 | -12 | -138 |
| | | 144 | 163 | 261 | 314 | 208 | 425 | 568 | 474 | 308 | 180 | 102 | 103 | 74 | 86 | 154 | 334 | 332 | 409 | 172 | 45 | 35 | 30 | 30 | 31 | 208 |
| 8 | | 20 | 25 | 27 | 25 | 35 | 64 | 75 | 75 | 89 | 95 | 52 | 33 | 20 | 30 | 29 | 28 | 31 | 37 | 66 | 170 | 174 | 122 | 56 | 51 | 60 |
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| | | 36 | 46 | 45 | 54 | 92 | 157 | 292 | 196 | 256 | 155 | 247 | 189 | 55 | 46 | 59 | 96 | 179 | 120 | 136 | 417 | 570 | 402 | 149 | 76 | 170 |
| 9 | | 30 | 28 | 30 | 22 | 17 | 12 | 15 | 22 | 29 | 25 | 29 | 50 | 70 | 109 | 100 | 58 | 44 | 80 | 130 | 135 | 42 | 38 | 37 | 36 | 49 |
| | | -25 | -51 | -34 | -67 | -44 | -40 | -32 | -30 | -97 | -30 | -47 | -233 | -148 | -259 | -212 | -177 | -146 | -108 | -189 | -378 | -22 | -5 | -13 | -14 | -100 |
| | | 56 | 80 | 65 | 90 | 62 | 53 | 47 | 53 | 127 | 56 | 76 | 283 | 219 | 368 | 312 | 235 | 190 | 189 | 321 | 515 | 65 | 44 | 52 | 51 | 150 |
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| | | 64 | 146 | 508 | 187 | 71 | 338 | 299 | 186 | 175 | 203 | 80 | 49 | 39 | 46 | 71 | 40 | 39 | 30 | 37 | 40 | 54 | 31 | 33 | 36 | 117 |
| 11 | | 18 | 18 | 14 | 23 | 41 | 42 | 40 | 39 | 71 | 78 | 78 | 97 | 137 | 128 | 79 | 43 | 51 | 41 | 29 | 25 | 20 | 23 | 39 | 38 | 50 |
| | | -21 | -21 | -19 | -26 | -72 | -181 | -126 | -102 | -107 | -226 | -168 | -167 | -381 | -307 | -264 | -139 | -111 | -120 | -15 | -5 | -7 | -12 | -21 | -44 | -111 |
| | | 40 | 40 | 35 | 50 | 114 | 224 | 168 | 141 | 179 | 305 | 248 | 266 | 518 | 436 | 343 | 183 | 163 | 163 | 46 | 32 | 28 | 36 | 61 | 84 | 163 |
| 12 | | 25 | 18 | 11 | 29 | 50 | 37 | 30 | 16 | 14 | 28 | 25 | 55 | 37 | 31 | 16 | 16 | 14 | 16 | 25 | 20 | 17 | 29 | 26 | 20 | 25 |
| | | -19 | -15 | -18 | -52 | -132 | -185 | -31 | -19 | -27 | -28 | -22 | -43 | -150 | -86 | -20 | -18 | -17 | -12 | -36 | -43 | -15 | -10 | -11 | -17 | -43 |
| | | 46 | 34 | 31 | 83 | 184 | 224 | 62 | 36 | 42 | 57 | 49 | 99 | 189 | 118 | 37 | 35 | 32 | 29 | 63 | 64 | 33 | 41 | 38 | 38 | 69 |
| 13 | | 27 | 31 | 56 | 56 | 30 | 24 | 29 | 49 | 62 | 95 | 74 | 63 | 25 | 21 | 16 | 68 | 156 | 244 | 146 | 133 | 136 | 51 | 35 | 35 | 69 |
| | | -16 | -30 | -104 | -111 | -27 | -15 | -15 | -15 | -28 | -55 | -75 | -70 | -18 | -14 | -12 | -48 | -320 | -629 | -262 | -237 | -174 | -111 | -217 | -21 | -109 |
| | | 44 | 63 | 161 | 169 | 59 | 41 | 46 | 66 | 92 | 151 | 150 | 134 | 44 | 36 | 29 | 117 | 478 | 875 | 410 | 372 | 312 | 164 | 253 | 57 | 180 |
| 14 | | 19 | 10 | 7 | 9 | 10 | 14 | 10 | 16 | 29 | 31 | 29 | 42 | 86 | 124 | 77 | 67 | 17 | 35 | 24 | 30 | 36 | 29 | 26 | 25 | 33 |
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| | | 72 | 254 | 179 | 52 | 43 | 41 | 37 | 42 | 35 | 41 | 63 | 90 | 110 | 166 | 112 | 66 | 130 | 52 | 57 | 70 | 151 | 53 | 43 | 36 | 83 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 14 | 13 | 16 | 14 | 17 | 25 | 22 | 18 | 15 | 26 | 33 | 36 | 32 | 24 | 16 | 13 | 12 | 15 | 14 | 18 | 13 | 17 | 25 | 63 | 21 |
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| | 142 | 162 | 89 | 74 | 43 | 35 | 38 | 42 | 42 | 45 | 44 | 48 | 58 | 74 | 118 | 198 | 106 | 128 | 92 | 34 | 37 | 47 | 51 | 53 | 75 |
| 18 | 19 | 11 | 14 | 19 | 35 | 28 | 34 | 57 | 54 | 44 | 26 | 15 | 21 | 17 | 18 | 17 | 17 | 23 | 24 | 33 | 30 | 27 | 24 | 23 | 26 |
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| 19 | 20 | 27 | 31 | 59 | 93 | 210 | 202 | 194 | 266 | 207 | 68 | 44 | 15 | 12 | 12 | 12 | 20 | 22 | 44 | 54 | 53 | 48 | 32 | 31 | 74 |
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| 21 | 10 | 14 | 13 | 31 | 50 | 79 | 96 | 74 | 49 | 67 | 40 | 17 | 12 | 6 | 11 | 13 | 19 | 24 | 16 | 14 | 14 | 16 | 18 | 20 | 30 |
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| | 38 | 40 | 40 | 58 | 156 | 230 | 260 | 158 | 87 | 106 | 96 | 42 | 40 | 28 | 23 | 24 | 23 | 35 | 28 | 28 | 36 | 41 | 42 | 45 | 71 |
| 22 | 18 | 15 | 14 | 23 | 33 | 36 | 70 | 77 | 84 | 35 | 26 | 49 | 35 | 24 | 28 | 24 | 38 | 34 | 49 | 43 | 54 | 69 | 68 | 41 | 41 |
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| 24 | 48 | 65 | 78 | 78 | 89 | 122 | 146 | 70 | 55 | 89 | 81 | 183 | 215 | 193 | 70 | 40 | 23 | 22 | 57 | 96 | 127 | 93 | 41 | 31 | 88 |
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| | 68 | 171 | 269 | 170 | 203 | 254 | 234 | 118 | 72 | 114 | 106 | 680 | 779 | 597 | 176 | 55 | 38 | 73 | 110 | 174 | 406 | 239 | 45 | 34 | 216 |
| 25 | 22 | 22 | 22 | 33 | 31 | 37 | 38 | 39 | 38 | 30 | 16 | 18 | 15 | 13 | 14 | 38 | 12 | 21 | 30 | 45 | 68 | 57 | 47 | 42 | 31 |
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| 26 | 36 | 19 | 27 | 28 | 23 | 15 | 13 | 24 | 27 | 23 | 18 | 33 | 25 | 47 | 35 | 27 | 27 | 30 | 30 | 29 | 24 | 27 | 30 | 30 | 27 |
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| 27 | 27 | 26 | 17 | 21 | 46 | 87 | 48 | 80 | 100 | 123 | 263 | 159 | 128 | 116 | 50 | 52 | 114 | 40 | 39 | 90 | 90 | 71 | 105 | 68 | 82 |
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| | 46 | 44 | 36 | 41 | 86 | 282 | 120 | 174 | 380 | 329 | 501 | 468 | 224 | 205 | 127 | 125 | 300 | 97 | 70 | 158 | 205 | 149 | 180 | 135 | 187 |
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| 29 | 41 | 22 | 14 | 13 | 24 | 30 | 23 | 12 | 24 | 32 | 54 | 46 | 25 | 19 | 19 | 23 | 25 | 26 | 56 | 94 | 107 | 44 | 40 | 44 | 36 |
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| | 56 | 47 | 46 | 47 | 47 | 64 | 56 | 62 | 58 | 57 | 52 | 52 | 48 | 47 | 46 | 80 | 144 | 66 | 59 | 44 | 49 | 57 | 63 | 64 | 59 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES MAY 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 25 | 20 | 22 | 21 | 23 | 24 | 22 | 23 | 36 | 69 | 62 | 38 | 31 | 25 | 20 | 18 | 24 | 27 | 24 | 37 | 51 | 66 | 43 | 56 | 34 |
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| 5 | | 18 | 14 | 16 | 11 | 15 | 14 | 14 | 25 | 23 | 35 | 57 | 53 | 49 | 39 | 37 | 15 | 23 | 39 | 50 | 64 | 38 | 20 | 17 | 12 | 29 |
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| 8 | | 51 | 54 | 42 | 51 | 51 | 45 | 40 | 72 | 60 | 42 | 52 | 65 | 53 | 47 | 37 | 26 | 46 | 35 | 29 | 20 | 15 | 25 | 34 | 35 | 43 |
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| | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | 191 | 85 | 76 | 127 | 165 | 279 | 210 | 135 | 143 | 142 | 225 | 107 | 77 | 68 | 103 | 241 | 222 | 158 | 230 | 249 | 297 | 552 | 292 | 208 | 191 |
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| 25 | 186 | 221 | 186 | 294 | 337 | 309 | 352 | 393 | 366 | 261 | 196 | 86 | 51 | 38 | 32 | 22 | 31 | 30 | 38 | 35 | 29 | 23 | 15 | 14 | 148 |
| | -211 | -371 | -466 | -601 | -629 | -651 | -553 | -393 | -476 | -118 | -145 | -22 | -33 | -25 | -41 | -31 | -24 | -15 | -19 | -12 | -16 | -20 | -24 | -30 | -205 |
| | 399 | 593 | 653 | 896 | 966 | 962 | 906 | 787 | 843 | 380 | 341 | 109 | 85 | 64 | 74 | 54 | 55 | 46 | 57 | 48 | 46 | 44 | 40 | 45 | 354 |
| 26 | 13 | 12 | 10 | 10 | 10 | 42 | 106 | 34 | 39 | 54 | 105 | 165 | 168 | 125 | 157 | 152 | 174 | 203 | 244 | 240 | 259 | 230 | 283 | 284 | 130 |
| | -26 | -29 | -37 | -33 | -29 | -35 | -87 | -83 | -29 | -48 | -47 | -252 | -278 | -244 | -192 | -133 | -244 | -278 | -202 | -190 | -387 | -299 | -285 | -301 | -157 |
| | 40 | 42 | 47 | 44 | 40 | 78 | 195 | 118 | 69 | 102 | 152 | 417 | 446 | 370 | 350 | 285 | 419 | 482 | 447 | 430 | 648 | 530 | 570 | 586 | 288 |
| 27 | 301 | 271 | 237 | 256 | 270 | 300 | 342 | 333 | 337 | 283 | 302 | 258 | 186 | 142 | 83 | 33 | 25 | 53 | 25 | 53 | 93 | 107 | 98 | 91 | 187 |
| | -370 | -319 | -254 | -268 | -298 | -484 | -554 | -523 | -420 | -542 | -536 | -467 | -295 | -245 | -173 | -98 | -49 | -30 | -19 | -41 | -110 | -222 | -127 | -28 | -270 |
| | 672 | 592 | 493 | 526 | 570 | 786 | 898 | 858 | 759 | 827 | 839 | 725 | 481 | 387 | 256 | 131 | 75 | 85 | 45 | 94 | 204 | 330 | 227 | 120 | 458 |
| 28 | 58 | 36 | 22 | 16 | 27 | 61 | 112 | 84 | 120 | 153 | 69 | 52 | 47 | 36 | 40 | 19 | 18 | 19 | 48 | 113 | 109 | 100 | 219 | 289 | 78 |
| | -32 | -31 | -25 | -30 | -33 | -128 | -174 | -158 | -94 | -96 | -87 | -38 | -34 | -21 | -26 | -34 | -15 | -16 | -36 | -87 | -98 | -98 | -353 | -357 | -87 |
| | 90 | 68 | 47 | 47 | 61 | 190 | 288 | 243 | 215 | 249 | 157 | 91 | 81 | 58 | 67 | 54 | 33 | 36 | 85 | 200 | 207 | 198 | 574 | 647 | 166 |
| 29 | 270 | 229 | 190 | 295 | 266 | 221 | 164 | 284 | 393 | 422 | 446 | 311 | 199 | 251 | 202 | 99 | 69 | 55 | 42 | 22 | 23 | 20 | 23 | 24 | 188 |
| | -223 | -242 | -341 | -452 | -256 | -153 | -128 | -255 | -646 | -831 | -574 | -531 | -392 | -681 | -349 | -96 | -101 | -54 | -28 | -32 | -21 | -16 | -21 | -21 | -269 |
| | 494 | 473 | 533 | 748 | 523 | 375 | 293 | 540 | 1040 | 1254 | 1021 | 843 | 592 | 932 | 552 | 195 | 171 | 109 | 71 | 55 | 45 | 37 | 46 | 46 | 458 |
| 30 | 16 | 13 | 9 | 2 | -1 | 7 | 10 | 38 | 119 | 204 | 86 | 53 | 125 | 162 | 112 | 53 | 50 | 40 | 128 | 176 | 202 | 177 | 82 | 59 | 80 |
| | -17 | -30 | -27 | -26 | -28 | -36 | -33 | -32 | -129 | -368 | -172 | -43 | -108 | -443 | -267 | -39 | -23 | -39 | -220 | -331 | -151 | -115 | -82 | -44 | -117 |
| | 35 | 44 | 37 | 29 | 27 | 44 | 45 | 71 | 249 | 572 | 258 | 97 | 233 | 606 | 380 | 92 | 74 | 81 | 348 | 507 | 354 | 292 | 166 | 104 | 198 |
| 31 | 53 | 58 | 61 | 39 | 67 | 114 | 112 | 70 | 142 | 184 | 192 | 230 | 208 | 178 | 104 | 153 | 204 | 286 | 293 | 216 | 214 | 265 | 237 | 256 | 164 |
| | -49 | -70 | -54 | -62 | -139 | -83 | -191 | -61 | -88 | -231 | -274 | -251 | -254 | -204 | -164 | -261 | -263 | -276 | -261 | -541 | -438 | -310 | -190 | -234 | -206 |
| | 103 | 130 | 116 | 102 | 208 | 198 | 304 | 132 | 232 | 415 | 466 | 481 | 463 | 382 | 268 | 415 | 468 | 562 | 554 | 758 | 653 | 577 | 428 | 491 | 371 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES JUNE 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 178 | 181 | 100 | 102 | 35 | 30 | 27 | 18 | 16 | 45 | 138 | 145 | 142 | 69 | 63 | 58 | 53 | 78 | 99 | 108 | 73 | 54 | 67 | 159 | 85 |
| | AL | -146 | -145 | -153 | -78 | -21 | -19 | -18 | -21 | -22 | -21 | -49 | -216 | -244 | -109 | -99 | -43 | -53 | -85 | -162 | -76 | -23 | -12 | -40 | -112 | -82 |
| | AE | 325 | 327 | 253 | 182 | 58 | 51 | 46 | 40 | 39 | 67 | 188 | 361 | 386 | 179 | 163 | 102 | 107 | 165 | 262 | 184 | 97 | 67 | 108 | 273 | 168 |
| 2 | | 144 | 140 | 60 | 100 | 110 | 165 | 112 | 114 | 91 | 109 | 70 | 37 | 29 | 24 | 20 | 24 | 26 | 25 | 29 | 31 | 37 | 39 | 35 | 20 | 66 |
| | | -326 | -233 | -77 | -60 | -182 | -287 | -191 | -136 | -99 | -180 | -44 | -25 | -24 | -13 | -12 | -10 | -16 | -10 | -13 | -17 | -34 | -43 | -71 | -35 | -89 |
| | | 471 | 373 | 139 | 161 | 293 | 453 | 304 | 252 | 191 | 290 | 114 | 62 | 54 | 38 | 34 | 35 | 43 | 36 | 43 | 49 | 72 | 82 | 107 | 55 | 156 |
| 3 | | 20 | 11 | 9 | 18 | 14 | 16 | 19 | 37 | 40 | 42 | 47 | 61 | 76 | 55 | 27 | 21 | 29 | 48 | 59 | 64 | 61 | 36 | 35 | 34 | 37 |
| | | -27 | -22 | -21 | -20 | -15 | -17 | -22 | -16 | -24 | -28 | -47 | -46 | -72 | -97 | -41 | -30 | -26 | -24 | -63 | -77 | -98 | -44 | -39 | -20 | -39 |
| | | 47 | 34 | 32 | 40 | 31 | 34 | 42 | 54 | 65 | 71 | 94 | 108 | 148 | 153 | 68 | 52 | 56 | 73 | 123 | 143 | 159 | 80 | 75 | 55 | 77 |
| 4 | | 21 | 19 | 17 | 21 | 32 | 65 | 85 | 93 | 84 | 97 | 116 | 133 | 187 | 127 | 71 | 32 | 49 | 78 | 68 | 80 | 56 | 35 | 55 | 75 | 71 |
| | | -16 | -17 | -20 | -16 | -19 | -31 | -96 | -151 | -128 | -150 | -77 | -202 | -449 | -233 | -87 | -64 | -50 | -121 | -83 | -16 | -39 | -22 | -28 | -32 | -89 |
| | | 38 | 37 | 39 | 38 | 53 | 97 | 182 | 245 | 213 | 247 | 193 | 336 | 636 | 360 | 159 | 97 | 100 | 201 | 152 | 96 | 96 | 58 | 83 | 108 | 161 |
| 5 | | 89 | 83 | 74 | 73 | 83 | 66 | 47 | 52 | 75 | 60 | 80 | 90 | 111 | 79 | 78 | 95 | 118 | 88 | 58 | 101 | 61 | 66 | 85 | 64 | 78 |
| | | -79 | -65 | -88 | -129 | -149 | -45 | -30 | -37 | -31 | -37 | -43 | -48 | -233 | -138 | -94 | -64 | -212 | -181 | -32 | -46 | -25 | -25 | -39 | -75 | -81 |
| | | 168 | 149 | 163 | 204 | 234 | 113 | 78 | 91 | 107 | 99 | 123 | 138 | 345 | 217 | 173 | 160 | 332 | 270 | 91 | 147 | 86 | 92 | 125 | 140 | 160 |
| 6 | | 35 | 36 | 45 | 69 | 83 | 127 | 155 | 230 | 450 | 483 | 372 | 232 | 321 | 295 | 180 | 144 | 133 | 177 | 220 | 289 | 230 | 179 | 143 | 162 | 200 |
| | | -23 | -21 | -56 | -129 | -48 | -149 | -281 | -443 | -638 | -654 | -527 | -309 | -513 | -666 | -292 | -175 | -85 | -139 | -605 | -527 | -383 | -363 | -260 | -134 | -309 |
| | | 59 | 58 | 103 | 200 | 132 | 277 | 438 | 674 | 1089 | 1138 | 900 | 543 | 835 | 961 | 473 | 320 | 220 | 317 | 826 | 817 | 613 | 543 | 403 | 296 | 510 |
| 7 | | 101 | 180 | 72 | 34 | 15 | 15 | 19 | 23 | 55 | 123 | 146 | 76 | 101 | 112 | 69 | 73 | 95 | 142 | 227 | 217 | 155 | 133 | 124 | 105 | 101 |
| | | -49 | -266 | -127 | -21 | -21 | -26 | -25 | -24 | -14 | -49 | -210 | -80 | -88 | -214 | -207 | -138 | -182 | -272 | -313 | -273 | -141 | -48 | -39 | -127 | -123 |
| | | 150 | 447 | 200 | 56 | 37 | 43 | 45 | 48 | 69 | 173 | 357 | 156 | 189 | 326 | 277 | 212 | 278 | 415 | 542 | 490 | 297 | 182 | 164 | 233 | 224 |
| 8 | | 51 | 17 | 11 | 9 | 14 | 30 | 59 | 60 | 73 | 67 | 85 | 89 | 63 | 47 | 26 | 31 | 36 | 27 | 23 | 12 | 23 | 30 | 23 | 47 | 40 |
| | | -66 | -29 | -27 | -24 | -39 | -53 | -122 | -112 | -73 | -137 | -105 | -86 | -52 | -106 | -121 | -26 | -18 | -24 | -21 | -18 | -28 | -34 | -29 | -34 | -58 |
| | | 118 | 46 | 40 | 34 | 54 | 84 | 183 | 173 | 148 | 205 | 190 | 176 | 116 | 154 | 148 | 58 | 55 | 53 | 45 | 31 | 52 | 64 | 53 | 82 | 98 |
| 9 | | 32 | 47 | 30 | 37 | 58 | 52 | 45 | 61 | 74 | 60 | 43 | 33 | 23 | 22 | 19 | 24 | 38 | 33 | 28 | 27 | 30 | 33 | 47 | 125 | 43 |
| | | -26 | -28 | -26 | -31 | -79 | -60 | -46 | -77 | -100 | -63 | -44 | -21 | -16 | -16 | -17 | -26 | -24 | -25 | -37 | -21 | -28 | -40 | -49 | -97 | -42 |
| | | 59 | 75 | 57 | 69 | 139 | 113 | 92 | 140 | 175 | 125 | 89 | 54 | 40 | 39 | 37 | 50 | 63 | 59 | 66 | 49 | 58 | 73 | 98 | 224 | 85 |
| 10 | | 208 | 144 | 97 | 47 | 42 | 23 | 20 | 28 | 15 | 22 | 45 | 33 | 34 | 35 | 53 | 36 | 52 | 43 | 38 | 33 | 33 | 25 | 25 | 27 | 48 |
| | | -153 | -104 | -47 | -23 | -20 | -13 | -8 | -12 | -11 | -20 | -40 | -48 | -37 | -26 | -18 | -10 | -24 | -21 | -14 | -18 | -19 | -28 | -36 | -24 | -32 |
| | | 362 | 250 | 146 | 72 | 63 | 37 | 29 | 41 | 27 | 44 | 86 | 82 | 72 | 62 | 72 | 47 | 76 | 64 | 53 | 52 | 53 | 55 | 62 | 51 | 82 |
| 11 | | 37 | 25 | 15 | 14 | 27 | 61 | 108 | 133 | 72 | 55 | 104 | 146 | 71 | 51 | 59 | 55 | 60 | 64 | 74 | 109 | 121 | 70 | 53 | 42 | 68 |
| | | -7 | -10 | -9 | -14 | -22 | -13 | -70 | -84 | -34 | -34 | -50 | -243 | -56 | -1 | -9 | -22 | -34 | -9 | -81 | -165 | -95 | -49 | -9 | -16 | -47 |
| | | 44 | 36 | 26 | 29 | 51 | 76 | 179 | 219 | 106 | 90 | 155 | 390 | 128 | 53 | 68 | 78 | 95 | 73 | 157 | 274 | 216 | 120 | 62 | 58 | 116 |
| 12 | | 77 | 63 | 93 | 107 | 146 | 199 | 92 | 113 | 123 | 136 | 135 | 157 | 83 | 121 | 69 | 31 | 67 | 74 | 99 | 118 | 132 | 114 | 91 | 64 | 104 |
| | | -50 | -60 | -116 | -63 | -132 | -216 | -99 | -48 | -77 | -102 | -72 | -126 | -69 | -143 | -168 | -67 | -90 | -119 | -60 | -64 | -267 | -150 | -47 | -36 | -102 |
| | | 128 | 124 | 211 | 172 | 280 | 416 | 193 | 162 | 201 | 238 | 207 | 283 | 153 | 265 | 239 | 100 | 158 | 194 | 161 | 183 | 399 | 264 | 139 | 101 | 207 |
| 13 | | 130 | 81 | 94 | 103 | 162 | 180 | 110 | 99 | 84 | 160 | 139 | 102 | 104 | 84 | 55 | 56 | 55 | 57 | 59 | 56 | 48 | 65 | 55 | 44 | 91 |
| | | -105 | -95 | -57 | -65 | -111 | -184 | -149 | -41 | -30 | -106 | -212 | -114 | -180 | -130 | -63 | -92 | -105 | -9 | -5 | -20 | -24 | -53 | -65 | -32 | -85 |
| | | 236 | 177 | 152 | 169 | 273 | 366 | 261 | 141 | 115 | 267 | 351 | 216 | 285 | 214 | 118 | 149 | 162 | 67 | 65 | 77 | 73 | 119 | 121 | 77 | 177 |
| 14 | | 63 | 89 | 61 | 61 | 54 | 78 | 141 | 116 | 66 | 69 | 117 | 95 | 65 | 51 | 30 | 25 | 21 | 22 | 24 | 25 | 23 | 57 | 93 | 75 | 63 |
| | | -31 | -45 | -76 | -71 | -20 | -44 | -108 | -311 | -119 | -73 | -117 | -64 | -103 | -25 | -12 | -13 | -12 | -14 | -16 | -26 | -25 | -57 | -112 | -115 | -67 |
| | | 95 | 135 | 138 | 133 | 75 | 123 | 250 | 427 | 186 | 142 | 234 | 160 | 169 | 77 | 44 | 39 | 35 | 38 | 41 | 52 | 49 | 115 | 206 | 192 | 131 |
| 15 | | 53 | 33 | 30 | 32 | 24 | 16 | 20 | 12 | 16 | 25 | 29 | 58 | 57 | 60 | 43 | 27 | 54 | 63 | 48 | 48 | 34 | 31 | 41 | 62 | 38 |
| | | -35 | -18 | -16 | -16 | -20 | -25 | -21 | -19 | -21 | -30 | -34 | -29 | -29 | -37 | -18 | -22 | -74 | -217 | -107 | -18 | -14 | -22 | -26 | -31 | -38 |
| | | 89 | 52 | 47 | 48 | 45 | 42 | 42 | 33 | 38 | 56 | 64 | 88 | 87 | 97 | 62 | 50 | 130 | 281 | 157 | 67 | 49 | 54 | 68 | 93 | 77 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 99 | 99 | 69 | 68 | 62 | 65 | 117 | 183 | 100 | 45 | 34 | 48 | 54 | 47 | 58 | 36 | 35 | 74 | 103 | 227 | 208 | 151 | 87 | 107 | 91 |
| | -54 | -85 | -39 | -27 | -39 | -42 | -68 | -219 | -166 | -37 | -28 | -26 | -24 | -28 | -81 | -50 | -102 | -154 | -95 | -118 | -221 | -121 | -90 | -85 | -83 |
| | 154 | 185 | 109 | 95 | 103 | 109 | 186 | 403 | 267 | 83 | 63 | 75 | 79 | 75 | 139 | 87 | 139 | 230 | 199 | 345 | 430 | 273 | 178 | 193 | 175 |
| 17 | 107 | 138 | 79 | 42 | 24 | 29 | 23 | 25 | 44 | 69 | 113 | 138 | 99 | 73 | 65 | 27 | 25 | 34 | 39 | 34 | 34 | 56 | 64 | 93 | 62 |
| | -111 | -229 | -165 | -30 | -18 | -26 | -27 | -18 | -19 | -21 | -65 | -145 | -147 | -138 | -123 | -54 | -16 | -10 | -5 | -5 | -6 | -49 | -68 | -107 | -67 |
| | 219 | 368 | 246 | 74 | 43 | 56 | 52 | 45 | 64 | 91 | 178 | 283 | 247 | 212 | 189 | 81 | 42 | 46 | 45 | 40 | 40 | 107 | 133 | 201 | 129 |
| 18 | 135 | 92 | 38 | 25 | 60 | 125 | 148 | 97 | 109 | 53 | 31 | 66 | 86 | 71 | 25 | 36 | 51 | 63 | 57 | 58 | 31 | 30 | 34 | 96 | 67 |
| | -150 | -50 | -24 | -17 | -19 | -93 | -170 | -55 | -75 | -61 | -34 | -43 | -40 | -30 | -20 | -74 | -137 | -38 | -23 | -89 | -66 | -22 | -32 | -81 | -60 |
| | 285 | 143 | 64 | 43 | 81 | 219 | 320 | 153 | 184 | 115 | 67 | 109 | 126 | 101 | 46 | 110 | 189 | 102 | 81 | 148 | 99 | 52 | 66 | 177 | 128 |
| 19 | 194 | 195 | 181 | 139 | 243 | 219 | 151 | 204 | 439 | 203 | 107 | 238 | 145 | 133 | 83 | 64 | 40 | 31 | 44 | 65 | 135 | 176 | 282 | 197 | 163 |
| | -389 | -231 | -68 | -105 | -233 | -165 | -199 | -311 | -528 | -403 | -38 | -164 | -467 | -266 | -38 | -17 | -19 | -15 | -18 | -37 | -160 | -252 | -483 | -290 | -204 |
| | 584 | 426 | 250 | 245 | 477 | 386 | 352 | 517 | 968 | 608 | 146 | 402 | 613 | 400 | 122 | 83 | 60 | 47 | 62 | 102 | 295 | 429 | 766 | 487 | 368 |
| 20 | 125 | 79 | 45 | 31 | 25 | 28 | 17 | 31 | 73 | 91 | 147 | 143 | 186 | 129 | 166 | 151 | 159 | 191 | 240 | 282 | 222 | 134 | 166 | 205 | 128 |
| | -119 | -27 | -28 | -33 | -30 | -22 | -22 | -23 | -24 | -46 | -129 | -180 | -237 | -298 | -309 | -252 | -230 | -245 | -416 | -383 | -264 | -159 | -183 | -306 | -165 |
| | 245 | 106 | 74 | 65 | 55 | 51 | 41 | 55 | 98 | 137 | 276 | 324 | 424 | 427 | 476 | 405 | 391 | 437 | 657 | 666 | 487 | 295 | 349 | 511 | 294 |
| 21 | 192 | 46 | 55 | 62 | 56 | 74 | 35 | 39 | 60 | 60 | 57 | 36 | 22 | 35 | 41 | 40 | 31 | 41 | 60 | 36 | 39 | 40 | 60 | 54 | 53 |
| | -159 | -29 | -38 | -39 | -111 | -76 | -25 | -21 | -31 | -63 | -58 | -32 | -21 | -30 | -93 | -149 | -94 | -113 | -117 | -28 | -33 | -42 | -57 | -59 | -63 |
| | 352 | 77 | 95 | 102 | 168 | 152 | 61 | 61 | 92 | 124 | 115 | 68 | 44 | 65 | 135 | 190 | 125 | 155 | 179 | 65 | 73 | 82 | 118 | 114 | 117 |
| 22 | 55 | 23 | 9 | 5 | 16 | 28 | 58 | 86 | 72 | 64 | 39 | 105 | 100 | 73 | 45 | 20 | 15 | 15 | 49 | 67 | 84 | 64 | 70 | 84 | 52 |
| | -47 | -27 | -30 | -24 | -18 | -17 | -34 | -141 | -59 | -53 | -64 | -93 | -173 | -48 | -66 | -99 | -35 | -17 | -37 | -100 | -110 | -78 | -61 | -46 | -61 |
| | 102 | 50 | 39 | 30 | 35 | 46 | 93 | 228 | 132 | 119 | 103 | 198 | 274 | 122 | 111 | 120 | 52 | 32 | 87 | 167 | 195 | 143 | 132 | 132 | 114 |
| 23 | 113 | 97 | 70 | 53 | 95 | 51 | 44 | 27 | 18 | 15 | 33 | 27 | 36 | 39 | 25 | 15 | 29 | 38 | 43 | 76 | 98 | 58 | 44 | 36 | 49 |
| | -50 | -41 | -38 | -36 | -137 | -58 | -15 | -35 | -31 | -29 | -24 | -21 | -17 | -22 | -24 | -29 | -68 | -98 | -64 | -117 | -150 | -53 | -31 | -26 | -51 |
| | 164 | 139 | 108 | 91 | 233 | 111 | 61 | 63 | 50 | 45 | 58 | 48 | 54 | 62 | 50 | 45 | 99 | 138 | 107 | 194 | 249 | 112 | 77 | 62 | 101 |
| 24 | 27 | 23 | 17 | 18 | 22 | 26 | 58 | 120 | 79 | 38 | 21 | 25 | 27 | 26 | 42 | 43 | 64 | 76 | 90 | 149 | 192 | 134 | 126 | 141 | 66 |
| | -32 | -36 | -25 | -17 | -13 | -11 | -13 | -191 | -185 | -48 | -26 | -23 | -23 | -16 | -22 | -89 | -179 | -286 | -198 | -86 | -52 | -38 | -168 | -102 | -78 |
| | 60 | 59 | 43 | 35 | 36 | 38 | 72 | 313 | 265 | 88 | 48 | 49 | 50 | 42 | 64 | 132 | 244 | 362 | 289 | 235 | 244 | 172 | 294 | 244 | 145 |
| 25 | 91 | 58 | 38 | 38 | 29 | 26 | 30 | 49 | 54 | 60 | 120 | 105 | 74 | 58 | 51 | 43 | 40 | 64 | 126 | 143 | 137 | 216 | 246 | 307 | 92 |
| | -31 | -19 | -25 | -18 | -14 | -17 | -42 | -29 | -35 | -57 | -67 | -103 | -52 | -60 | -82 | -114 | -81 | -150 | -222 | -130 | -64 | -247 | -286 | -315 | -94 |
| | 123 | 78 | 64 | 56 | 44 | 44 | 74 | 78 | 90 | 117 | 187 | 209 | 126 | 119 | 134 | 158 | 122 | 216 | 349 | 274 | 202 | 464 | 534 | 624 | 187 |
| 26 | 232 | 212 | 211 | 175 | 227 | 115 | 32 | 24 | 41 | 92 | 71 | 67 | 61 | 67 | 35 | 46 | 60 | 77 | 95 | 46 | 42 | 50 | 43 | 102 | 93 |
| | -294 | -345 | -272 | -209 | -131 | -72 | -38 | -18 | -31 | -30 | -19 | -25 | -7 | -25 | -48 | -48 | -67 | -147 | -98 | -7 | 3 | -1 | -9 | -63 | -83 |
| | 527 | 558 | 484 | 384 | 358 | 189 | 71 | 43 | 73 | 122 | 91 | 93 | 69 | 93 | 84 | 94 | 129 | 225 | 194 | 54 | 37 | 52 | 53 | 166 | 177 |
| 27 | 74 | 41 | 42 | 40 | 49 | 52 | 80 | 55 | 104 | 195 | 226 | 207 | 80 | 42 | 35 | 20 | 21 | 21 | 30 | 30 | 33 | 29 | 24 | 24 | 65 |
| | -41 | -30 | -27 | -29 | -35 | -68 | -29 | -32 | -61 | -158 | -245 | -189 | -173 | -73 | -40 | -33 | -55 | -33 | -23 | -32 | -24 | -15 | -13 | -14 | -61 |
| | 115 | 71 | 70 | 69 | 85 | 121 | 111 | 89 | 165 | 353 | 471 | 396 | 255 | 116 | 76 | 55 | 77 | 56 | 54 | 63 | 58 | 45 | 38 | 38 | 127 |
| 28 | 21 | 30 | 37 | 79 | 130 | 107 | 104 | 93 | 68 | 45 | 39 | 28 | 38 | 47 | 45 | 40 | 35 | 31 | 33 | 32 | 34 | 41 | 59 | 58 | 53 |
| | -22 | -21 | -22 | -71 | -277 | -206 | -78 | -39 | -44 | -27 | -16 | -18 | -21 | -17 | -7 | -7 | -22 | 0 | 0 | -10 | -25 | -33 | -46 | -58 | -45 |
| | 44 | 51 | 60 | 152 | 408 | 315 | 184 | 133 | 113 | 73 | 56 | 48 | 61 | 65 | 53 | 48 | 57 | 31 | 32 | 42 | 60 | 74 | 106 | 116 | 99 |
| 29 | 74 | 57 | 75 | 103 | 74 | 55 | 50 | 64 | 66 | 54 | 67 | 44 | 58 | 55 | 45 | 37 | 58 | 58 | 68 | 60 | 55 | 67 | 134 | 185 | 69 |
| | -39 | -30 | -32 | -152 | -118 | -13 | -5 | -32 | -62 | -40 | -158 | -30 | -27 | -43 | -52 | -50 | -88 | -165 | -101 | -48 | -52 | -61 | -140 | -188 | -72 |
| | 113 | 87 | 107 | 257 | 193 | 69 | 56 | 97 | 129 | 94 | 226 | 75 | 86 | 99 | 97 | 89 | 147 | 225 | 170 | 110 | 107 | 129 | 275 | 374 | 142 |
| 30 | 118 | 41 | 17 | 21 | 37 | 39 | 44 | 34 | 32 | 82 | 76 | 46 | 36 | 44 | 54 | 33 | 22 | 19 | 23 | 35 | 40 | 36 | 30 | 36 | 41 |
| | -76 | -20 | -32 | -21 | -13 | -25 | -73 | -32 | -25 | -32 | -54 | -39 | -23 | -18 | -35 | -46 | -5 | 0 | -3 | -17 | -31 | -48 | -33 | -23 | -30 |
| | 194 | 61 | 49 | 43 | 52 | 66 | 118 | 67 | 58 | 115 | 131 | 86 | 60 | 63 | 89 | 79 | 28 | 20 | 27 | 52 | 71 | 85 | 64 | 60 | 72 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES JULY 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 36 | 27 | 19 | 13 | 13 | 8 | 15 | 22 | 28 | 27 | 31 | 32 | 32 | 35 | 35 | 34 | 19 | 20 | 21 | 23 | 27 | 30 | 42 | 45 | 26 |
| | AL | -20 | -26 | -26 | -21 | -15 | -12 | -16 | -15 | -21 | -26 | -30 | -25 | -25 | -20 | -22 | -32 | -37 | -31 | -30 | -38 | -86 | -55 | -57 | -38 | -30 |
| | AE | 58 | 55 | 47 | 36 | 30 | 21 | 31 | 38 | 49 | 54 | 62 | 58 | 58 | 57 | 59 | 67 | 57 | 51 | 52 | 62 | 113 | 86 | 100 | 83 | 58 |
| 2 | | 42 | 36 | 59 | 64 | 100 | 82 | 40 | 27 | 28 | 38 | 33 | 20 | 18 | 25 | 20 | 28 | 24 | 16 | 29 | 51 | 106 | 115 | 105 | 111 | 51 |
| | | -24 | -27 | -29 | -37 | -119 | -72 | -33 | -37 | -17 | -15 | -25 | -24 | -30 | -21 | -29 | -38 | -42 | -52 | -47 | -53 | -196 | -104 | -111 | -71 | -52 |
| | | 67 | 65 | 88 | 101 | 220 | 155 | 74 | 64 | 46 | 54 | 59 | 45 | 49 | 48 | 49 | 67 | 66 | 69 | 77 | 104 | 303 | 219 | 217 | 184 | 104 |
| 3 | | 64 | 52 | 33 | 15 | 29 | 27 | 53 | 76 | 68 | 70 | 59 | 37 | 45 | 40 | 31 | 30 | 37 | 34 | 34 | 57 | 95 | 137 | 116 | 127 | 57 |
| | | -24 | -36 | -36 | -22 | -71 | -10 | -15 | -20 | -52 | -50 | -54 | -32 | -34 | -35 | -47 | -32 | -28 | -32 | -27 | -29 | -40 | -29 | -105 | -196 | -44 |
| | | 89 | 90 | 70 | 37 | 101 | 39 | 69 | 98 | 121 | 121 | 113 | 69 | 81 | 76 | 79 | 62 | 66 | 66 | 63 | 88 | 136 | 168 | 222 | 324 | 102 |
| 4 | | 110 | 81 | 85 | 87 | 54 | 122 | 149 | 51 | 29 | 26 | 23 | 21 | 28 | 30 | 24 | 32 | 40 | 34 | 34 | 38 | 58 | 62 | 62 | 72 | 56 |
| | | -153 | -72 | -96 | -68 | -55 | -63 | -117 | -64 | -20 | -22 | -26 | -27 | -35 | -34 | -37 | -70 | -96 | -102 | -20 | -18 | -67 | -62 | -76 | -43 | -60 |
| | | 264 | 153 | 182 | 157 | 111 | 187 | 267 | 116 | 49 | 49 | 49 | 49 | 64 | 65 | 62 | 103 | 137 | 136 | 55 | 58 | 126 | 125 | 139 | 116 | 117 |
| 5 | | 76 | 100 | 101 | 84 | 77 | 103 | 120 | 92 | 45 | 91 | 108 | 117 | 105 | 72 | 51 | 54 | 44 | 32 | 31 | 32 | 46 | 64 | 90 | 106 | 77 |
| | | -59 | -134 | -168 | -164 | -120 | -88 | -62 | -28 | -24 | -51 | -135 | -136 | -76 | -57 | -67 | -86 | -173 | -66 | -17 | -28 | -103 | -82 | -63 | -103 | -87 |
| | | 136 | 235 | 270 | 249 | 198 | 193 | 184 | 121 | 69 | 142 | 244 | 254 | 183 | 131 | 118 | 140 | 218 | 99 | 50 | 62 | 150 | 147 | 154 | 211 | 165 |
| 6 | | 94 | 61 | 66 | 58 | 42 | 32 | 22 | 41 | 55 | 107 | 85 | 114 | 78 | 89 | 69 | 43 | 28 | 32 | 41 | 57 | 94 | 77 | 42 | 25 | 60 |
| | | -48 | -27 | -59 | -142 | -22 | -21 | -32 | -18 | -21 | -39 | -74 | -102 | -105 | -148 | -120 | -107 | -104 | -52 | -34 | -77 | -133 | -94 | -44 | -19 | -68 |
| | | 144 | 89 | 126 | 200 | 65 | 54 | 55 | 60 | 77 | 147 | 160 | 216 | 184 | 238 | 190 | 151 | 133 | 86 | 76 | 135 | 228 | 173 | 88 | 46 | 130 |
| 7 | | 21 | 24 | 28 | 28 | 16 | 4 | 6 | 15 | 37 | 46 | 28 | 33 | 56 | 67 | 56 | 60 | 56 | 36 | 34 | 52 | 78 | 61 | 46 | 51 | 39 |
| | | -21 | -32 | -23 | -28 | -15 | -13 | -12 | -13 | -15 | -25 | -32 | -33 | -33 | -97 | -98 | -141 | -173 | -158 | -52 | -47 | -83 | -31 | -26 | -14 | -51 |
| | | 44 | 57 | 53 | 57 | 33 | 19 | 18 | 30 | 53 | 73 | 61 | 67 | 90 | 166 | 155 | 201 | 229 | 196 | 87 | 101 | 161 | 92 | 73 | 65 | 91 |
| 8 | | 61 | 72 | 88 | 93 | 107 | 176 | 231 | 100 | 60 | 99 | 131 | 146 | 117 | 111 | 90 | 69 | 50 | 49 | 63 | 83 | 99 | 117 | 114 | 92 | 101 |
| | | -26 | -49 | -44 | -128 | -88 | -83 | -98 | -111 | -42 | -30 | -41 | -81 | -127 | -182 | -175 | -103 | -95 | -32 | -17 | -166 | -166 | -154 | -143 | -125 | -96 |
| | | 88 | 122 | 133 | 222 | 196 | 260 | 331 | 212 | 104 | 130 | 173 | 228 | 245 | 294 | 266 | 172 | 147 | 82 | 82 | 250 | 266 | 273 | 259 | 219 | 198 |
| 9 | | 57 | 44 | 97 | 108 | 155 | 165 | 200 | 131 | 182 | 237 | 119 | 40 | 37 | 54 | 82 | 50 | 47 | 45 | 55 | 71 | 104 | 179 | 111 | 66 | 101 |
| | | -22 | -21 | -63 | -270 | -119 | -202 | -207 | -121 | -229 | -267 | -113 | -13 | -11 | -13 | -42 | -12 | -22 | -38 | -38 | -53 | -30 | -141 | -156 | -32 | -93 |
| | | 81 | 67 | 161 | 379 | 275 | 368 | 409 | 253 | 412 | 506 | 233 | 54 | 49 | 68 | 124 | 64 | 70 | 84 | 94 | 125 | 135 | 321 | 268 | 100 | 196 |
| 10 | | 69 | 145 | 140 | 194 | 237 | 256 | 238 | 224 | 95 | 57 | 185 | 164 | 157 | 146 | 88 | 52 | 40 | 32 | 52 | 65 | 90 | 67 | 70 | 57 | 122 |
| | | -44 | -242 | -415 | -316 | -258 | -248 | -198 | -260 | -152 | -41 | -133 | -329 | -198 | -238 | -220 | -54 | -55 | -29 | -45 | -193 | -112 | -22 | -30 | -26 | -161 |
| | | 114 | 388 | 556 | 512 | 497 | 506 | 438 | 485 | 249 | 99 | 319 | 494 | 355 | 385 | 309 | 108 | 96 | 63 | 98 | 259 | 203 | 90 | 102 | 84 | 284 |
| 11 | | 42 | 41 | 74 | 70 | 103 | 120 | 147 | 191 | 130 | 92 | 116 | 160 | 132 | 85 | 63 | 57 | 48 | 48 | 64 | 44 | 30 | 45 | 73 | 83 | 86 |
| | | -93 | -85 | -56 | -140 | -172 | -114 | -311 | -318 | -131 | -60 | -80 | -162 | -182 | -137 | -65 | -87 | -61 | -68 | -6 | -24 | -19 | -13 | -78 | -129 | -108 |
| | | 136 | 127 | 130 | 211 | 277 | 236 | 459 | 510 | 262 | 152 | 197 | 323 | 315 | 223 | 130 | 146 | 109 | 117 | 71 | 70 | 50 | 59 | 153 | 214 | 195 |
| 12 | | 60 | 51 | 71 | 83 | 136 | 172 | 143 | 100 | 121 | 203 | 153 | 114 | 150 | 107 | 44 | 42 | 39 | 30 | 29 | 31 | 33 | 83 | 93 | 97 | 91 |
| | | -43 | -22 | -36 | -137 | -181 | -155 | -135 | -149 | -157 | -333 | -171 | -213 | -279 | -162 | -44 | -28 | -37 | -23 | -37 | -24 | -26 | -75 | -132 | -160 | -115 |
| | | 105 | 74 | 108 | 221 | 318 | 329 | 280 | 251 | 279 | 538 | 325 | 328 | 430 | 269 | 90 | 72 | 77 | 54 | 67 | 57 | 60 | 160 | 226 | 258 | 207 |
| 13 | | 90 | 80 | 46 | 33 | 26 | 30 | 27 | 21 | 20 | 23 | 18 | 30 | 35 | 32 | 22 | 19 | 21 | 26 | 30 | 31 | 43 | 31 | 50 | 60 | 35 |
| | | -94 | -75 | -69 | -33 | -19 | -42 | -26 | -19 | -25 | -34 | -41 | -43 | -41 | -40 | -28 | -20 | -27 | -33 | -38 | -34 | -41 | -30 | -57 | -71 | -41 |
| | | 186 | 156 | 116 | 67 | 47 | 73 | 53 | 41 | 46 | 57 | 59 | 74 | 78 | 74 | 52 | 40 | 49 | 60 | 70 | 67 | 85 | 63 | 108 | 132 | 77 |
| 14 | | 57 | 74 | 41 | 23 | 50 | 175 | 122 | 42 | 24 | 23 | 22 | 27 | 47 | 45 | 30 | 19 | 27 | 41 | 32 | 27 | 28 | 53 | 89 | 82 | 50 |
| | | -49 | -44 | -24 | -12 | -22 | -100 | -146 | -41 | -16 | -25 | -35 | -40 | -37 | -34 | -31 | -66 | -44 | -71 | -60 | -54 | -37 | -54 | -50 | -118 | -50 |
| | | 107 | 119 | 65 | 35 | 74 | 277 | 270 | 84 | 41 | 49 | 58 | 68 | 85 | 81 | 62 | 86 | 72 | 113 | 93 | 82 | 66 | 108 | 139 | 202 | 101 |
| 15 | | 74 | 64 | 34 | 13 | 46 | 102 | 92 | 154 | 92 | 53 | 169 | 351 | 109 | 207 | 224 | 214 | 191 | 152 | 204 | 100 | 167 | 241 | 226 | 203 | 145 |
| | | -45 | -46 | -28 | -22 | -33 | -98 | -137 | -119 | -58 | -40 | -220 | -355 | -138 | -314 | -537 | -433 | -104 | -97 | -214 | -95 | -105 | -361 | -547 | -417 | -190 |
| | | 121 | 111 | 64 | 36 | 81 | 201 | 230 | 275 | 151 | 94 | 389 | 706 | 248 | 522 | 761 | 649 | 296 | 251 | 419 | 196 | 273 | 603 | 774 | 620 | 336 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 129 | 156 | 158 | 199 | 100 | 147 | 125 | 117 | 198 | 196 | 64 | 27 | 38 | 59 | 82 | 38 | 121 | 260 | 200 | 121 | 53 | 92 | 121 | 135 | 122 |
| | -581 | -240 | -373 | -417 | -164 | -109 | -124 | -153 | -288 | -422 | -76 | -18 | -19 | -65 | -146 | -144 | -261 | -504 | -413 | -151 | -53 | -78 | -184 | -299 | -220 |
| | 710 | 398 | 531 | 616 | 265 | 257 | 251 | 271 | 487 | 619 | 141 | 46 | 58 | 125 | 230 | 183 | 383 | 765 | 615 | 273 | 108 | 172 | 306 | 436 | 343 |
| 17 | 101 | 82 | 96 | 150 | 175 | 206 | 79 | 68 | 110 | 102 | 128 | 174 | 136 | 132 | 97 | 52 | 42 | 44 | 61 | 135 | 111 | 129 | 98 | 133 | 110 |
| | -192 | -145 | -209 | -263 | -461 | -379 | -112 | -64 | -77 | -129 | -124 | -263 | -228 | -227 | -205 | -151 | -35 | -18 | -41 | -257 | -157 | -91 | -137 | -319 | -179 |
| | 295 | 229 | 306 | 414 | 638 | 586 | 193 | 134 | 188 | 232 | 252 | 438 | 365 | 360 | 303 | 204 | 78 | 63 | 104 | 393 | 269 | 222 | 236 | 454 | 290 |
| 18 | 150 | 77 | 113 | 127 | 117 | 95 | 95 | 34 | 26 | 39 | 86 | 161 | 137 | 69 | 44 | 39 | 37 | 46 | 55 | 76 | 131 | 104 | 66 | 52 | 82 |
| | -371 | -119 | -96 | -235 | -319 | -164 | -158 | -125 | -42 | -27 | -89 | -185 | -350 | -127 | -114 | -78 | -208 | -112 | -56 | -112 | -336 | -143 | -107 | -40 | -155 |
| | 522 | 197 | 210 | 363 | 437 | 260 | 254 | 160 | 68 | 67 | 175 | 347 | 488 | 197 | 159 | 117 | 246 | 159 | 111 | 189 | 468 | 248 | 174 | 94 | 238 |
| 19 | 45 | 73 | 49 | 63 | 74 | 80 | 57 | 30 | 21 | 112 | 128 | 88 | 74 | 97 | 90 | 63 | 38 | 42 | 74 | 95 | 115 | 104 | 142 | 117 | 78 |
| | -67 | -206 | -168 | -63 | -129 | -135 | -25 | -27 | -27 | -38 | -240 | -212 | -52 | -82 | -282 | -278 | -94 | -50 | -85 | -103 | -78 | -238 | -201 | -176 | -127 |
| | 113 | 281 | 219 | 128 | 204 | 217 | 82 | 57 | 48 | 152 | 369 | 302 | 127 | 181 | 372 | 341 | 132 | 93 | 159 | 199 | 194 | 343 | 345 | 295 | 206 |
| 20 | 101 | 85 | 82 | 83 | 120 | 59 | 46 | 15 | 66 | 61 | 37 | 34 | 54 | 62 | 46 | 40 | 65 | 72 | 62 | 34 | 71 | 131 | 203 | 67 | 71 |
| | -122 | -82 | -63 | -249 | -227 | -48 | -36 | -27 | -45 | -73 | -57 | -47 | -31 | -100 | -35 | -97 | -161 | -181 | -102 | -40 | -79 | -223 | -297 | -77 | -104 |
| | 224 | 167 | 145 | 333 | 349 | 108 | 83 | 43 | 112 | 135 | 96 | 83 | 87 | 162 | 82 | 138 | 227 | 254 | 165 | 75 | 150 | 355 | 502 | 145 | 176 |
| 21 | 125 | 38 | 27 | 13 | 67 | 28 | 108 | 127 | 115 | 99 | 45 | 78 | 62 | 55 | 43 | 57 | 59 | 34 | 35 | 28 | 36 | 25 | 41 | 70 | 59 |
| | -90 | -37 | -31 | -39 | -34 | -40 | -108 | -248 | -182 | -75 | -43 | -53 | -72 | -33 | -31 | -42 | -30 | -126 | -16 | -19 | -33 | -36 | -52 | -53 | -64 |
| | 216 | 77 | 60 | 53 | 103 | 69 | 217 | 375 | 298 | 175 | 89 | 132 | 135 | 90 | 76 | 100 | 91 | 161 | 52 | 49 | 70 | 63 | 94 | 124 | 124 |
| 22 | 90 | 79 | 85 | 120 | 84 | 131 | 177 | 187 | 157 | 69 | 29 | 29 | 45 | 23 | 17 | 23 | 38 | 30 | 55 | 65 | 143 | 90 | 89 | 133 | 83 |
| | -129 | -102 | -49 | -98 | -129 | -177 | -427 | -292 | -239 | -103 | -26 | -27 | -37 | -23 | -24 | -27 | -39 | -41 | -76 | -56 | -164 | -168 | -92 | -107 | -111 |
| | 220 | 182 | 135 | 219 | 215 | 309 | 605 | 479 | 397 | 173 | 56 | 57 | 83 | 47 | 42 | 52 | 77 | 72 | 133 | 122 | 307 | 260 | 183 | 241 | 194 |
| 23 | 64 | 28 | 19 | 25 | 39 | 57 | 73 | 36 | 25 | 24 | 35 | 58 | 64 | 67 | 81 | 55 | 56 | 90 | 120 | 109 | 151 | 129 | 70 | 55 | 64 |
| | -46 | -60 | -39 | -22 | -40 | -91 | -105 | -35 | -28 | -25 | -28 | -33 | -48 | -55 | -174 | -111 | -139 | -119 | -192 | -124 | -59 | -175 | -69 | -56 | -78 |
| | 112 | 89 | 60 | 48 | 80 | 149 | 179 | 72 | 53 | 49 | 64 | 92 | 114 | 123 | 256 | 166 | 196 | 211 | 314 | 234 | 211 | 304 | 140 | 113 | 143 |
| 24 | 44 | 21 | 34 | 36 | 63 | 52 | 35 | 21 | 19 | 18 | 30 | 28 | 64 | 41 | 30 | 23 | 74 | 113 | 186 | 125 | 106 | 99 | 65 | 107 | 60 |
| | -37 | -38 | -50 | -50 | -41 | -82 | -47 | -22 | -25 | -31 | -27 | -26 | -40 | -32 | -43 | -36 | -37 | -142 | -260 | -109 | -30 | -35 | -46 | -167 | -61 |
| | 82 | 61 | 86 | 87 | 106 | 135 | 83 | 44 | 45 | 50 | 59 | 56 | 105 | 74 | 75 | 61 | 112 | 257 | 448 | 236 | 138 | 134 | 113 | 275 | 122 |
| 25 | 100 | 91 | 79 | 85 | 99 | 50 | 88 | 141 | 78 | 258 | 287 | 348 | 172 | 56 | 48 | 117 | 128 | 135 | 137 | 135 | 172 | 155 | 97 | 88 | 131 |
| | -248 | -56 | -52 | -49 | -134 | -39 | -112 | -196 | -69 | -206 | -560 | -367 | -156 | -44 | -21 | -55 | -256 | -203 | -188 | -204 | -107 | -246 | -81 | -64 | -155 |
| | 349 | 148 | 131 | 134 | 234 | 90 | 201 | 339 | 148 | 465 | 848 | 716 | 328 | 102 | 71 | 173 | 385 | 339 | 326 | 339 | 280 | 402 | 179 | 153 | 287 |
| 26 | 90 | 81 | 51 | 18 | 10 | 14 | 49 | 41 | 48 | 70 | 54 | 31 | 25 | 29 | 18 | 17 | 24 | 28 | 32 | 30 | 24 | 21 | 20 | 20 | 35 |
| | -40 | -41 | -38 | -36 | -35 | -31 | -44 | -51 | -31 | -31 | -20 | -14 | -15 | -36 | -31 | -24 | -24 | -25 | -15 | -11 | -19 | -27 | -35 | -37 | -30 |
| | 131 | 124 | 90 | 55 | 45 | 46 | 94 | 93 | 80 | 103 | 75 | 46 | 41 | 66 | 50 | 42 | 48 | 54 | 48 | 42 | 45 | 49 | 56 | 58 | 66 |
| 27 | 41 | 105 | 154 | 149 | 126 | 200 | 152 | 139 | 111 | 138 | 124 | 77 | 63 | 68 | 50 | 41 | 41 | 65 | 76 | 53 | 46 | 35 | 24 | 41 | 88 |
| | -44 | -90 | -221 | -178 | -100 | -147 | -121 | -86 | -37 | -72 | -65 | -40 | -53 | -20 | -23 | -47 | -52 | -66 | -113 | -29 | -18 | -18 | -17 | -24 | -70 |
| | 87 | 195 | 375 | 329 | 228 | 349 | 274 | 226 | 149 | 210 | 190 | 118 | 117 | 90 | 75 | 89 | 95 | 132 | 191 | 83 | 65 | 54 | 42 | 66 | 159 |
| 28 | 38 | 68 | 88 | 74 | 30 | 23 | 26 | 27 | 47 | 115 | 280 | 334 | 232 | 263 | 347 | 315 | 214 | 255 | 305 | 335 | 194 | 164 | 216 | 218 | 175 |
| | -29 | -48 | -104 | -149 | -11 | -10 | -22 | -29 | -27 | -31 | -301 | -345 | -283 | -527 | -501 | -253 | -132 | -126 | -231 | -236 | -219 | -79 | -93 | -92 | -162 |
| | 68 | 117 | 192 | 223 | 41 | 34 | 48 | 57 | 75 | 148 | 582 | 679 | 516 | 791 | 849 | 569 | 347 | 382 | 538 | 573 | 414 | 244 | 310 | 311 | 338 |
| 29 | 168 | 176 | 398 | 304 | 353 | 429 | 573 | 427 | 249 | 120 | 221 | 156 | 130 | 184 | 152 | 62 | 57 | 51 | 29 | 13 | 18 | 20 | 44 | 109 | 185 |
| | -168 | -433 | -654 | -424 | -747 | -471 | -626 | -640 | -619 | -501 | -416 | -406 | -429 | -439 | -337 | -88 | -66 | -35 | -20 | -22 | -16 | -26 | -33 | -89 | -321 |
| | 337 | 610 | 1053 | 730 | 1101 | 900 | 1200 | 1068 | 868 | 621 | 637 | 563 | 560 | 623 | 490 | 151 | 124 | 87 | 51 | 36 | 34 | 47 | 79 | 199 | 507 |
| 30 | 135 | 166 | 106 | 63 | 60 | 98 | 114 | 68 | 119 | 179 | 163 | 179 | 145 | 109 | 141 | 50 | 42 | 33 | 18 | 25 | 30 | 59 | 85 | 169 | 98 |
| | -129 | -242 | -218 | -70 | -63 | -93 | -158 | -101 | -101 | -82 | -103 | -139 | -192 | -310 | -310 | -41 | -38 | -34 | -19 | -25 | -29 | -36 | -67 | -278 | -120 |
| | 265 | 409 | 324 | 133 | 123 | 193 | 274 | 170 | 221 | 262 | 267 | 319 | 338 | 419 | 452 | 92 | 81 | 68 | 37 | 52 | 60 | 95 | 153 | 448 | 219 |
| 31 | 177 | 173 | 192 | 260 | 195 | 125 | 138 | 145 | 112 | 56 | 94 | 77 | 70 | 58 | 59 | 48 | 44 | 45 | 62 | 110 | 130 | 101 | 69 | 38 | 107 |
| | -467 | -402 | -332 | -410 | -480 | -251 | -173 | -270 | -158 | -38 | -74 | -128 | -110 | -52 | -74 | -43 | -63 | -23 | -37 | -97 | -165 | -71 | -30 | -28 | -166 |
| | 644 | 576 | 526 | 671 | 676 | 378 | 313 | 417 | 271 | 95 | 168 | 206 | 180 | 111 | 134 | 91 | 108 | 70 | 100 | 208 | 296 | 173 | 100 | 67 | 274 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES — AUGUST 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 57 | 168 | 131 | 210 | 312 | 131 | 99 | 45 | 60 | 91 | 61 | 29 | 59 | 40 | 46 | 46 | 42 | 55 | 88 | 88 | 83 | 80 | 106 | 106 | 93 |
| | AL | -47 | -175 | -276 | -333 | -365 | -210 | -75 | -43 | -47 | -120 | -108 | -27 | -49 | -35 | -29 | -93 | -19 | -119 | -89 | -75 | -82 | -69 | -119 | -124 | -114 |
| | AE | 105 | 345 | 408 | 544 | 679 | 342 | 175 | 90 | 108 | 211 | 170 | 57 | 109 | 75 | 76 | 139 | 61 | 175 | 178 | 164 | 166 | 150 | 225 | 230 | 208 |
| 2 | | 126 | 108 | 100 | 64 | 56 | 103 | 57 | 54 | 22 | 49 | 21 | 73 | 69 | 42 | 40 | 21 | 27 | 58 | 75 | 70 | 62 | 56 | 63 | 57 | 61 |
| | | -109 | -96 | -141 | -37 | -27 | -48 | -166 | -90 | -25 | -30 | -31 | -27 | -95 | -70 | -12 | -12 | -24 | -84 | -130 | -101 | -70 | -63 | -89 | -51 | -68 |
| | | 237 | 205 | 242 | 102 | 84 | 152 | 225 | 146 | 49 | 80 | 53 | 101 | 165 | 113 | 53 | 34 | 52 | 143 | 206 | 172 | 133 | 119 | 153 | 108 | 130 |
| 3 | | 62 | 84 | 91 | 84 | 75 | 75 | 58 | 38 | 35 | 64 | 160 | 239 | 258 | 183 | 316 | 356 | 307 | 286 | 175 | 107 | 90 | 52 | 49 | 37 | 137 |
| | | -55 | -57 | -80 | -52 | -153 | -24 | -8 | -16 | -18 | -12 | -194 | -395 | -434 | -421 | -446 | -381 | -343 | -147 | -133 | -76 | -48 | -23 | -29 | -38 | -149 |
| | | 118 | 141 | 173 | 138 | 230 | 100 | 67 | 56 | 55 | 78 | 355 | 634 | 692 | 604 | 763 | 738 | 650 | 434 | 310 | 184 | 139 | 76 | 79 | 76 | 287 |
| 4 | | 57 | 68 | 61 | 36 | 85 | 50 | 60 | 68 | 64 | 97 | 120 | 108 | 53 | 57 | 60 | 37 | 50 | 57 | 94 | 108 | 122 | 143 | 118 | 165 | 81 |
| | | -78 | -85 | -85 | -17 | -61 | -165 | -86 | -59 | -86 | -80 | -128 | -95 | -45 | -39 | -53 | -105 | -111 | -156 | -100 | -88 | -45 | -194 | -190 | -155 | -96 |
| | | 136 | 154 | 147 | 54 | 148 | 217 | 148 | 129 | 150 | 178 | 248 | 205 | 98 | 96 | 113 | 142 | 162 | 214 | 195 | 197 | 168 | 338 | 309 | 321 | 178 |
| 5 | | 186 | 127 | 124 | 178 | 158 | 148 | 153 | 221 | 181 | 298 | 265 | 158 | 101 | 69 | 96 | 81 | 54 | 61 | 62 | 102 | 110 | 76 | 45 | 38 | 129 |
| | | -216 | -412 | -221 | -99 | -318 | -165 | -158 | -427 | -363 | -377 | -339 | -185 | -88 | -103 | -273 | -141 | -87 | -85 | -62 | -141 | -178 | -67 | -20 | -19 | -189 |
| | | 403 | 540 | 346 | 279 | 477 | 315 | 312 | 650 | 545 | 676 | 605 | 344 | 190 | 173 | 370 | 223 | 142 | 147 | 125 | 244 | 290 | 145 | 65 | 58 | 319 |
| 6 | | 34 | 36 | 42 | 62 | 67 | 64 | 109 | 85 | 81 | 101 | 99 | 98 | 109 | 112 | 111 | 95 | 55 | 82 | 63 | 85 | 123 | 145 | 114 | 71 | 85 |
| | | -26 | -32 | -38 | -68 | -141 | -78 | -189 | -223 | -172 | -76 | -81 | -296 | -317 | -133 | -162 | -238 | -119 | -102 | -21 | -141 | -215 | -163 | -88 | -38 | -132 |
| | | 61 | 69 | 81 | 132 | 210 | 143 | 299 | 310 | 253 | 177 | 181 | 395 | 427 | 245 | 274 | 334 | 175 | 185 | 85 | 227 | 340 | 309 | 202 | 110 | 218 |
| 7 | | 80 | 103 | 70 | 58 | 49 | 36 | 53 | 70 | 46 | 68 | 68 | 73 | 112 | 74 | 33 | 19 | 32 | 46 | 51 | 52 | 43 | 37 | 38 | 31 | 56 |
| | | -55 | -272 | -114 | -20 | -26 | -36 | -35 | -31 | -29 | -57 | -66 | -71 | -99 | -103 | -79 | -30 | -20 | -20 | -24 | -7 | -6 | -16 | -26 | -23 | -53 |
| | | 136 | 376 | 185 | 79 | 76 | 73 | 90 | 103 | 76 | 126 | 136 | 145 | 212 | 177 | 113 | 49 | 52 | 67 | 76 | 60 | 50 | 54 | 64 | 54 | 110 |
| 8 | | 33 | 56 | 74 | 76 | 87 | 173 | 164 | 134 | 76 | 109 | 161 | 100 | 105 | 152 | 127 | 95 | 69 | 79 | 106 | 110 | 110 | 105 | 163 | 169 | 110 |
| | | -41 | -49 | -127 | -94 | -118 | -193 | -172 | -84 | -59 | -51 | -257 | -205 | -59 | -278 | -256 | -164 | -99 | -54 | -91 | -51 | -35 | -71 | -77 | -319 | -125 |
| | | 75 | 105 | 202 | 171 | 206 | 368 | 338 | 219 | 137 | 160 | 418 | 306 | 164 | 431 | 384 | 260 | 168 | 134 | 198 | 162 | 146 | 177 | 242 | 489 | 236 |
| 9 | | 170 | 114 | 65 | 103 | 161 | 131 | 85 | 60 | 62 | 88 | 145 | 116 | 135 | 169 | 157 | 121 | 93 | 60 | 66 | 71 | 65 | 45 | 34 | 48 | 98 |
| | | -279 | -126 | -40 | -93 | -222 | -267 | -125 | -47 | -107 | -65 | -62 | -84 | -185 | -537 | -402 | -215 | -137 | -74 | -89 | -42 | -29 | -16 | -18 | -43 | -138 |
| | | 450 | 241 | 105 | 198 | 384 | 400 | 212 | 108 | 169 | 154 | 207 | 201 | 320 | 706 | 559 | 336 | 230 | 135 | 156 | 114 | 95 | 62 | 53 | 91 | 237 |
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| | | 153 | 106 | 81 | 78 | 60 | 47 | 91 | 83 | 87 | 98 | 98 | 63 | 54 | 45 | 60 | 47 | 54 | 199 | 187 | 106 | 85 | 107 | 90 | 75 | 90 |
| 11 | | 49 | 61 | 54 | 28 | 23 | 21 | 19 | 20 | 28 | 30 | 31 | 27 | 31 | 32 | 43 | 44 | 53 | 75 | 121 | 82 | 103 | 108 | 64 | 83 | 51 |
| | | -25 | -39 | -59 | -62 | -16 | -21 | -21 | -21 | -17 | -22 | -27 | -24 | -19 | -19 | -34 | -27 | -80 | -169 | -221 | -112 | -110 | -84 | -53 | -56 | -56 |
| | | 75 | 101 | 115 | 91 | 40 | 43 | 41 | 42 | 46 | 53 | 59 | 52 | 52 | 53 | 77 | 72 | 134 | 244 | 343 | 196 | 215 | 194 | 118 | 139 | 108 |
| 12 | | 122 | 111 | 114 | 110 | 97 | 101 | 99 | 72 | 89 | 134 | 81 | 56 | 119 | 130 | 235 | 241 | 168 | 113 | 153 | 221 | 166 | 235 | 270 | 233 | 145 |
| | | -234 | -240 | -101 | -135 | -71 | -13 | -115 | -67 | -161 | -83 | -58 | -33 | -111 | -548 | -725 | -525 | -220 | -123 | -139 | -342 | -247 | -211 | -340 | -425 | -219 |
| | | 357 | 352 | 216 | 247 | 169 | 115 | 216 | 140 | 250 | 218 | 140 | 91 | 231 | 678 | 961 | 767 | 388 | 238 | 294 | 565 | 415 | 447 | 611 | 659 | 365 |
| 13 | | 187 | 178 | 201 | 99 | 102 | 193 | 120 | 184 | 386 | 176 | 99 | 60 | 54 | 44 | 49 | 33 | 44 | 86 | 87 | 96 | 133 | 183 | 181 | 104 | 128 |
| | | -259 | -151 | -193 | -198 | -71 | -229 | -226 | -301 | -793 | -439 | -117 | -34 | -79 | -89 | -50 | -50 | -93 | -118 | -110 | -30 | -129 | -407 | -219 | -155 | -189 |
| | | 447 | 331 | 395 | 299 | 174 | 423 | 348 | 486 | 1180 | 616 | 217 | 95 | 134 | 134 | 100 | 84 | 137 | 204 | 198 | 126 | 264 | 591 | 401 | 260 | 319 |
| 14 | | 46 | 158 | 103 | 78 | 227 | 103 | 79 | 59 | 85 | 73 | 40 | 59 | 84 | 102 | 87 | 111 | 94 | 76 | 131 | 152 | 155 | 212 | 151 | 92 | 107 |
| | | -44 | -233 | -276 | -79 | -401 | -296 | -31 | -17 | -82 | -196 | -56 | -38 | -117 | -203 | -236 | -282 | -119 | -52 | -150 | -486 | -361 | -209 | -247 | -134 | -181 |
| | | 91 | 392 | 380 | 159 | 629 | 401 | 111 | 78 | 169 | 270 | 97 | 98 | 201 | 305 | 324 | 393 | 213 | 129 | 282 | 639 | 517 | 422 | 399 | 227 | 289 |
| 15 | | 116 | 74 | 59 | 75 | 169 | 88 | 83 | 161 | 183 | 211 | 150 | 134 | 65 | 78 | 85 | 82 | 58 | 61 | 116 | 179 | 178 | 237 | 201 | 144 | 124 |
| | | -139 | -133 | -55 | -34 | -201 | -311 | -112 | -160 | -532 | -390 | -212 | -202 | -292 | -160 | -206 | -206 | -33 | -20 | -123 | -327 | -199 | -523 | -340 | -275 | -216 |
| | | 256 | 208 | 115 | 110 | 371 | 401 | 197 | 321 | 715 | 601 | 362 | 336 | 357 | 238 | 292 | 288 | 93 | 82 | 240 | 508 | 378 | 762 | 543 | 420 | 341 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 124 | 116 | 94 | 108 | 163 | 162 | 77 | 103 | 76 | 158 | 71 | 79 | 96 | 93 | 95 | 52 | 48 | 60 | 89 | 85 | 91 | 116 | 86 | 96 | 97 |
| | -177 | -214 | -140 | -214 | -294 | -265 | -211 | -137 | -49 | -244 | -124 | -98 | -180 | -193 | -183 | -186 | -66 | -31 | -102 | -181 | -75 | -274 | -86 | -60 | -158 |
| | 302 | 331 | 235 | 323 | 459 | 428 | 289 | 241 | 126 | 403 | 196 | 178 | 276 | 286 | 278 | 239 | 115 | 93 | 192 | 268 | 168 | 392 | 172 | 157 | 256 |
| 17 | 67 | 80 | 76 | 55 | 106 | 40 | 69 | 83 | 114 | 86 | 79 | 31 | 60 | 79 | 153 | 224 | 151 | 80 | 77 | 72 | 93 | 85 | 74 | 52 | 87 |
| | -48 | -62 | -114 | -94 | -111 | -47 | -69 | -98 | -78 | -48 | -151 | -39 | -7 | -51 | -478 | -474 | -343 | -165 | -100 | -53 | -135 | -33 | -104 | -97 | -125 |
| | 116 | 143 | 191 | 150 | 218 | 88 | 140 | 183 | 193 | 135 | 230 | 71 | 68 | 131 | 631 | 698 | 495 | 246 | 178 | 127 | 230 | 118 | 180 | 150 | 213 |
| 18 | 45 | 42 | 70 | 71 | 74 | 100 | 61 | 95 | 59 | 58 | 35 | 16 | 25 | 16 | 29 | 52 | 62 | 62 | 43 | 74 | 71 | 47 | 50 | 36 | 54 |
| | -26 | -27 | -118 | -235 | -183 | -123 | -151 | -94 | -80 | -98 | -20 | -13 | -13 | -9 | -24 | -59 | -204 | -232 | -85 | -65 | -67 | -99 | -38 | -36 | -88 |
| | 72 | 71 | 190 | 307 | 259 | 224 | 213 | 191 | 140 | 157 | 56 | 30 | 39 | 26 | 54 | 112 | 266 | 294 | 129 | 139 | 139 | 148 | 88 | 73 | 142 |
| 19 | 35 | 65 | 101 | 117 | 160 | 120 | 69 | 124 | 67 | 38 | 47 | 60 | 81 | 154 | 129 | 47 | 70 | 76 | 57 | 54 | 75 | 80 | 82 | 96 | 84 |
| | -33 | -60 | -160 | -245 | -285 | -240 | -117 | -83 | -37 | -32 | -16 | -41 | -66 | -315 | -287 | -148 | -21 | -114 | -93 | -94 | -63 | -37 | -68 | -88 | -114 |
| | 69 | 126 | 263 | 364 | 447 | 362 | 188 | 208 | 105 | 71 | 64 | 102 | 148 | 470 | 417 | 195 | 92 | 191 | 150 | 150 | 140 | 118 | 151 | 186 | 199 |
| 20 | 119 | 117 | 88 | 107 | 98 | 117 | 99 | 119 | 57 | 56 | 77 | 65 | 87 | 139 | 78 | 43 | 50 | 70 | 83 | 69 | 66 | 52 | 43 | 54 | 81 |
| | -157 | -58 | -58 | -60 | -175 | -171 | -209 | -114 | -14 | -15 | -206 | -141 | -201 | -362 | -210 | -49 | -19 | -50 | -88 | -183 | -94 | -51 | -29 | -37 | -115 |
| | 277 | 177 | 147 | 169 | 274 | 290 | 309 | 234 | 72 | 72 | 284 | 207 | 288 | 502 | 288 | 92 | 69 | 121 | 172 | 254 | 161 | 104 | 73 | 92 | 197 |
| 21 | 86 | 82 | 81 | 62 | 67 | 77 | 95 | 54 | 95 | 86 | 79 | 74 | 52 | 42 | 21 | 33 | 57 | 56 | 75 | 64 | 40 | 23 | 21 | 21 | 60 |
| | -157 | -210 | -236 | -99 | -59 | -70 | -129 | -25 | -13 | -121 | -76 | -61 | -56 | -47 | -46 | -21 | -72 | -101 | -191 | -91 | -28 | -33 | -34 | -23 | -83 |
| | 245 | 293 | 319 | 162 | 128 | 148 | 226 | 80 | 110 | 207 | 156 | 137 | 109 | 89 | 67 | 55 | 129 | 157 | 267 | 156 | 69 | 57 | 55 | 45 | 144 |
| 22 | 18 | 21 | 38 | 36 | 48 | 42 | 21 | 24 | 24 | 44 | 51 | 57 | 55 | 54 | 68 | 47 | 53 | 89 | 128 | 196 | 76 | 47 | 39 | 38 | 55 |
| | -21 | -25 | -87 | -54 | -70 | -88 | -29 | -25 | -22 | -23 | -18 | -7 | -7 | -4 | -10 | -37 | -121 | -208 | -161 | -159 | -81 | -32 | -39 | -30 | -57 |
| | 40 | 47 | 126 | 92 | 120 | 131 | 51 | 51 | 47 | 68 | 70 | 65 | 63 | 58 | 79 | 84 | 175 | 298 | 290 | 356 | 158 | 80 | 79 | 69 | 112 |
| 23 | 42 | 90 | 67 | 74 | 76 | 70 | 67 | 47 | 109 | 121 | 97 | 178 | 208 | 122 | 140 | 131 | 237 | 216 | 183 | 219 | 187 | 162 | 85 | 52 | 124 |
| | -34 | -61 | -53 | -199 | -184 | -101 | -108 | -40 | -122 | -87 | -149 | -355 | -320 | -204 | -251 | -249 | -345 | -420 | -187 | -194 | -189 | -207 | -76 | -60 | -175 |
| | 77 | 152 | 121 | 275 | 262 | 172 | 176 | 88 | 232 | 209 | 247 | 533 | 529 | 327 | 391 | 380 | 584 | 636 | 371 | 415 | 377 | 371 | 162 | 113 | 300 |
| 24 | 51 | 48 | 136 | 113 | 64 | 36 | 35 | 24 | 24 | 54 | 88 | 146 | 238 | 200 | 82 | 49 | 55 | 117 | 170 | 120 | 72 | 48 | 50 | 81 | 88 |
| | -57 | -50 | -117 | -125 | -26 | -17 | -18 | -19 | -21 | -25 | -29 | -124 | -391 | -316 | -132 | -26 | -63 | -187 | -264 | -156 | -39 | -34 | -44 | -47 | -97 |
| | 108 | 100 | 255 | 239 | 92 | 54 | 54 | 45 | 47 | 80 | 118 | 271 | 629 | 516 | 215 | 75 | 119 | 305 | 434 | 277 | 112 | 82 | 95 | 129 | 185 |
| 25 | 44 | 31 | 15 | 20 | 20 | 30 | 36 | 108 | 261 | 408 | 276 | 202 | 201 | 414 | 433 | 202 | 339 | 297 | 258 | 294 | 214 | 158 | 284 | 252 | 200 |
| | -25 | -17 | -20 | -23 | -31 | -28 | -10 | -206 | -398 | -556 | -622 | -1126 | -596 | -686 | -872 | -357 | -648 | -797 | -674 | -468 | -267 | -396 | -425 | -215 | -394 |
| | 69 | 49 | 36 | 44 | 52 | 59 | 48 | 315 | 660 | 964 | 898 | 1329 | 798 | 1100 | 1305 | 560 | 987 | 1095 | 933 | 762 | 481 | 556 | 710 | 468 | 595 |
| 26 | 179 | 217 | 227 | 251 | 330 | 267 | 249 | 131 | 193 | 183 | 152 | 216 | 188 | 162 | 233 | 134 | 157 | 125 | 140 | 186 | 189 | 168 | 164 | 126 | 190 |
| | -241 | -345 | -440 | -490 | -582 | -513 | -326 | -178 | -157 | -293 | -190 | -272 | -441 | -170 | -269 | -267 | -415 | -318 | -252 | -192 | -295 | -225 | -162 | -170 | -300 |
| | 421 | 563 | 668 | 742 | 913 | 782 | 576 | 310 | 351 | 477 | 342 | 488 | 629 | 332 | 502 | 402 | 574 | 444 | 393 | 380 | 485 | 395 | 328 | 298 | 492 |
| 27 | 161 | 221 | 119 | 65 | 80 | 151 | 148 | 151 | 151 | 139 | 123 | 237 | 178 | 138 | 125 | 226 | 294 | 203 | 196 | 254 | 98 | 57 | 48 | 25 | 149 |
| | -143 | -200 | -75 | -29 | -29 | -304 | -367 | -166 | -108 | -247 | -219 | -267 | -249 | -205 | -141 | -411 | -734 | -374 | -391 | -329 | -75 | -25 | -24 | -23 | -214 |
| | 306 | 423 | 195 | 95 | 110 | 457 | 516 | 319 | 260 | 386 | 342 | 505 | 427 | 344 | 267 | 638 | 1029 | 577 | 587 | 584 | 174 | 83 | 73 | 49 | 364 |
| 28 | 20 | 31 | 40 | 73 | 48 | 50 | 24 | 20 | 35 | 60 | 117 | 129 | 102 | 58 | 60 | 118 | 156 | 165 | 226 | 225 | 292 | 284 | 207 | 202 | 114 |
| | -42 | -35 | -76 | -148 | -57 | -88 | -63 | -42 | -13 | -48 | -248 | -405 | -270 | -62 | -87 | -308 | -416 | -339 | -317 | -418 | -410 | -344 | -453 | -491 | -216 |
| | 63 | 67 | 117 | 222 | 106 | 139 | 88 | 64 | 50 | 109 | 365 | 534 | 372 | 121 | 147 | 427 | 573 | 504 | 544 | 644 | 703 | 629 | 661 | 695 | 331 |
| 29 | 181 | 95 | 78 | 71 | 47 | 61 | 92 | 38 | 33 | 35 | 37 | 58 | 21 | 26 | 26 | 66 | 103 | 146 | 235 | 292 | 128 | 137 | 159 | 179 | 98 |
| | -280 | -169 | -166 | -37 | -7 | -18 | -90 | -86 | -8 | -17 | -20 | -28 | -18 | -11 | -20 | -44 | -245 | -347 | -324 | -362 | -196 | -117 | -176 | -107 | -121 |
| | 463 | 265 | 246 | 109 | 55 | 81 | 183 | 125 | 43 | 53 | 58 | 86 | 40 | 38 | 48 | 112 | 349 | 493 | 560 | 655 | 325 | 255 | 337 | 287 | 220 |
| 30 | 142 | 67 | 47 | 47 | 63 | 62 | 112 | 164 | 208 | 155 | 83 | 35 | 33 | 26 | 53 | 81 | 140 | 119 | 85 | 91 | 95 | 153 | 107 | 89 | 94 |
| | -224 | -45 | -21 | -30 | -14 | -15 | -118 | -371 | -376 | -143 | -45 | -66 | -118 | -10 | -47 | -164 | -293 | -312 | -126 | -44 | -67 | -182 | -225 | -76 | -131 |
| | 368 | 114 | 69 | 78 | 77 | 79 | 232 | 536 | 584 | 298 | 130 | 102 | 152 | 37 | 101 | 247 | 434 | 432 | 212 | 136 | 163 | 336 | 333 | 166 | 226 |
| 31 | 140 | 92 | 67 | 110 | 161 | 118 | 118 | 327 | 241 | 79 | 189 | 160 | 155 | 265 | 284 | 317 | 465 | 308 | 203 | 146 | 140 | 108 | 105 | 132 | 185 |
| | -99 | -116 | -124 | -247 | -361 | -218 | -275 | -755 | -635 | -125 | -96 | -178 | -323 | -531 | -423 | -305 | -870 | -467 | -359 | -151 | -82 | -191 | -234 | -292 | -311 |
| | 240 | 209 | 192 | 358 | 524 | 338 | 394 | 1083 | 877 | 204 | 286 | 339 | 479 | 797 | 708 | 623 | 1336 | 776 | 563 | 298 | 224 | 301 | 341 | 425 | 496 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES SEPTEMBER 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 162 | 177 | 244 | 279 | 268 | 361 | 224 | 206 | 161 | 141 | 184 | 157 | 303 | 211 | 253 | 246 | 166 | 132 | 124 | 105 | 118 | 148 | 133 | 145 | 194 |
| | AL | -488 | -599 | -478 | -411 | -323 | -420 | -485 | -456 | -198 | -307 | -448 | -313 | -757 | -340 | -496 | -556 | -319 | -211 | -340 | -154 | -120 | -376 | -391 | -235 | -384 |
| | AE | 650 | 777 | 723 | 690 | 592 | 781 | 710 | 662 | 360 | 449 | 634 | 470 | 1061 | 553 | 751 | 803 | 486 | 344 | 464 | 260 | 239 | 525 | 524 | 382 | 579 |
| 2 | | 166 | 131 | 157 | 118 | 101 | 153 | 124 | 138 | 158 | 87 | 107 | 85 | 144 | 132 | 56 | 54 | 52 | 76 | 110 | 95 | 70 | 56 | 46 | 27 | 102 |
| | | -390 | -255 | -227 | -202 | -230 | -468 | -354 | -192 | -326 | -94 | -196 | -115 | -305 | -191 | -74 | -54 | -101 | -254 | -250 | -254 | -175 | -75 | -14 | -12 | -200 |
| | | 556 | 387 | 385 | 320 | 332 | 621 | 479 | 331 | 485 | 182 | 305 | 201 | 451 | 324 | 131 | 109 | 155 | 332 | 362 | 350 | 246 | 132 | 61 | 40 | 303 |
| 3 | | 18 | 21 | 15 | 33 | 43 | 55 | 67 | 47 | 40 | 27 | 39 | 24 | 30 | 31 | 20 | 18 | 15 | 17 | 16 | 18 | 19 | 15 | 14 | 13 | 27 |
| | | -9 | -33 | -17 | -40 | -39 | -56 | -101 | -189 | -54 | -9 | -22 | -30 | -23 | -36 | -23 | -21 | -18 | -15 | -12 | -11 | -14 | -19 | -21 | -19 | -35 |
| | | 28 | 55 | 32 | 73 | 83 | 112 | 170 | 238 | 95 | 36 | 61 | 55 | 54 | 69 | 44 | 40 | 34 | 33 | 30 | 30 | 34 | 35 | 36 | 33 | 63 |
| 4 | | 26 | 30 | 68 | 89 | 71 | 55 | 29 | 27 | 36 | 35 | 56 | 67 | 91 | 78 | 58 | 95 | 156 | 89 | 60 | 67 | 114 | 102 | 82 | 83 | 69 |
| | | -19 | -21 | -79 | -120 | -93 | -40 | -13 | -42 | -51 | -23 | -32 | -100 | -177 | -154 | -190 | -253 | -279 | -137 | -54 | -32 | -233 | -160 | -88 | -177 | -107 |
| | | 46 | 52 | 148 | 210 | 165 | 96 | 43 | 70 | 88 | 59 | 88 | 168 | 269 | 233 | 249 | 350 | 435 | 227 | 115 | 100 | 349 | 263 | 172 | 261 | 177 |
| 5 | | 80 | 77 | 98 | 97 | 113 | 163 | 116 | 81 | 92 | 108 | 142 | 120 | 101 | 44 | 39 | 31 | 28 | 28 | 32 | 46 | 76 | 105 | 114 | 115 | 85 |
| | | -197 | -80 | -67 | -91 | -104 | -128 | -349 | -154 | -125 | -73 | -204 | -148 | -144 | -25 | -19 | -6 | -10 | 0 | -5 | -7 | -24 | -123 | -89 | -141 | -96 |
| | | 277 | 159 | 165 | 189 | 217 | 292 | 466 | 235 | 219 | 183 | 347 | 269 | 246 | 69 | 59 | 37 | 38 | 27 | 39 | 55 | 101 | 229 | 204 | 257 | 182 |
| 6 | | 115 | 106 | 114 | 78 | 63 | 58 | 70 | 61 | 67 | 79 | 183 | 174 | 54 | 40 | 27 | 38 | 68 | 114 | 122 | 99 | 108 | 84 | 71 | 51 | 85 |
| | | -160 | -175 | -191 | -121 | -63 | -18 | -21 | -39 | -37 | -22 | -81 | -239 | -29 | -1 | -15 | -54 | -131 | -319 | -211 | -53 | -163 | -68 | -82 | -37 | -97 |
| | | 277 | 281 | 306 | 200 | 127 | 77 | 92 | 102 | 105 | 103 | 266 | 415 | 84 | 42 | 43 | 93 | 199 | 434 | 334 | 153 | 272 | 152 | 154 | 89 | 183 |
| 7 | | 30 | 18 | 25 | 21 | 25 | 47 | 87 | 83 | 94 | 96 | 80 | 53 | 112 | 99 | 147 | 55 | 38 | 26 | 34 | 43 | 32 | 61 | 107 | 158 | 65 |
| | | -13 | -9 | -20 | -16 | -12 | -9 | -63 | -122 | -122 | -151 | -23 | -51 | -191 | -347 | -265 | -159 | -83 | -39 | -11 | -42 | -13 | -24 | -84 | -372 | -93 |
| | | 44 | 28 | 45 | 39 | 38 | 56 | 151 | 206 | 216 | 248 | 103 | 105 | 303 | 448 | 413 | 216 | 122 | 66 | 46 | 87 | 46 | 87 | 192 | 531 | 160 |
| 8 | | 117 | 103 | 89 | 97 | 57 | 48 | 39 | 52 | 57 | 97 | 70 | 60 | 59 | 41 | 35 | 72 | 57 | 37 | 34 | 41 | 53 | 75 | 71 | 51 | 63 |
| | | -245 | -61 | -83 | -157 | -43 | -10 | -11 | -18 | -46 | -58 | -210 | -60 | -182 | -94 | -125 | -226 | -94 | -32 | -33 | -67 | -134 | -119 | -109 | -43 | -94 |
| | | 364 | 166 | 173 | 255 | 100 | 59 | 51 | 71 | 103 | 155 | 281 | 120 | 242 | 136 | 161 | 299 | 152 | 71 | 68 | 110 | 188 | 195 | 181 | 95 | 158 |
| 9 | | 43 | 59 | 72 | 38 | 52 | 54 | 70 | 121 | 103 | 113 | 49 | 63 | 51 | 36 | 27 | 17 | 19 | 28 | 37 | 34 | 40 | 40 | 54 | 43 | 53 |
| | | -13 | -56 | -134 | -130 | -60 | -26 | -19 | -121 | -368 | -52 | -16 | -44 | -43 | -16 | -27 | -18 | -32 | -16 | -29 | -51 | -70 | -66 | -38 | -52 | -62 |
| | | 57 | 116 | 206 | 169 | 113 | 80 | 89 | 243 | 472 | 166 | 65 | 108 | 95 | 52 | 55 | 35 | 53 | 45 | 67 | 86 | 111 | 108 | 94 | 97 | 116 |
| 10 | | 27 | 33 | 33 | 31 | 35 | 37 | 45 | 37 | 37 | 42 | 31 | 57 | 113 | 159 | 317 | 301 | 127 | 131 | 90 | 171 | 224 | 398 | 301 | 144 | 122 |
| | | -23 | -37 | -93 | -17 | -16 | -16 | -21 | -19 | -17 | -19 | -17 | -32 | -330 | -683 | -696 | -566 | -127 | -124 | -157 | -191 | -272 | -750 | -533 | -480 | -218 |
| | | 51 | 71 | 127 | 49 | 51 | 53 | 67 | 56 | 55 | 61 | 49 | 90 | 444 | 843 | 1014 | 868 | 256 | 256 | 248 | 363 | 496 | 1149 | 835 | 624 | 341 |
| 11 | | 121 | 95 | 136 | 172 | 148 | 66 | 39 | 61 | 167 | 179 | 85 | 96 | 95 | 59 | 62 | 49 | 185 | 258 | 195 | 259 | 291 | 296 | 117 | 70 | 138 |
| | | -486 | -506 | -182 | -94 | -174 | -30 | -19 | -25 | -189 | -519 | -499 | -254 | -192 | -190 | -64 | -30 | -149 | -501 | -454 | -443 | -300 | -294 | -140 | -72 | -242 |
| | | 608 | 602 | 319 | 268 | 323 | 98 | 58 | 86 | 358 | 699 | 585 | 351 | 289 | 251 | 127 | 80 | 335 | 760 | 650 | 703 | 592 | 590 | 258 | 143 | 380 |
| 12 | | 76 | 46 | 41 | 136 | 176 | 104 | 94 | 71 | 71 | 76 | 58 | 49 | 42 | 73 | 109 | 108 | 99 | 122 | 165 | 161 | 120 | 125 | 200 | 130 | 102 |
| | | -89 | -113 | -29 | -95 | -277 | -306 | -201 | -71 | -127 | -261 | -138 | -24 | -46 | -221 | -253 | -240 | -356 | -248 | -354 | -488 | -173 | -242 | -517 | -260 | -214 |
| | | 166 | 161 | 71 | 232 | 454 | 411 | 296 | 144 | 199 | 339 | 198 | 74 | 89 | 296 | 364 | 349 | 456 | 371 | 521 | 650 | 293 | 368 | 718 | 390 | 317 |
| 13 | | 177 | 156 | 141 | 91 | 68 | 100 | 40 | 32 | 74 | 66 | 53 | 60 | 112 | 81 | 252 | 270 | 133 | 57 | 32 | 33 | 55 | 128 | 162 | 118 | 104 |
| | | -340 | -377 | -229 | -158 | -120 | -111 | -15 | -1 | -33 | -28 | -22 | -37 | -216 | -367 | -431 | -589 | -344 | -44 | -35 | -19 | -26 | -196 | -500 | -644 | -203 |
| | | 517 | 534 | 371 | 251 | 188 | 212 | 55 | 33 | 108 | 95 | 75 | 99 | 329 | 449 | 685 | 860 | 479 | 102 | 69 | 54 | 82 | 325 | 663 | 762 | 308 |
| 14 | | 171 | 234 | 173 | 212 | 86 | 126 | 75 | 87 | 87 | 113 | 58 | 152 | 65 | 81 | 59 | 82 | 45 | 68 | 112 | 131 | 219 | 110 | 53 | 45 | 110 |
| | | -526 | -444 | -372 | -402 | -96 | -196 | -119 | -109 | -348 | -120 | -87 | -471 | -179 | -102 | -51 | -226 | -111 | -98 | -297 | -263 | -574 | -184 | -64 | -42 | -228 |
| | | 698 | 679 | 547 | 615 | 182 | 324 | 195 | 198 | 437 | 234 | 145 | 624 | 246 | 184 | 111 | 309 | 156 | 167 | 410 | 395 | 794 | 295 | 119 | 88 | 340 |
| 15 | | 106 | 89 | 77 | 61 | 109 | 104 | 98 | 90 | 137 | 146 | 100 | 143 | 179 | 144 | 95 | 79 | 184 | 118 | 150 | 206 | 169 | 221 | 169 | 140 | 130 |
| | | -170 | -267 | -103 | -35 | -145 | -364 | -191 | -66 | -453 | -407 | -89 | -310 | -511 | -366 | -177 | -125 | -394 | -439 | -339 | -355 | -185 | -285 | -531 | -506 | -284 |
| | | 277 | 357 | 181 | 97 | 255 | 469 | 290 | 157 | 591 | 555 | 190 | 454 | 691 | 511 | 274 | 205 | 579 | 558 | 489 | 562 | 355 | 507 | 701 | 647 | 415 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 164 | 150 | 107 | 47 | 70 | 103 | 112 | 86 | 74 | 127 | 125 | 94 | 70 | 82 | 82 | 59 | 77 | 99 | 54 | 99 | 99 | 105 | 128 | 81 | 96 |
| | -375 | -320 | -130 | -17 | -119 | -180 | -298 | -120 | -32 | -152 | -466 | -191 | -63 | -233 | -131 | -87 | -175 | -306 | -147 | -92 | -73 | -251 | -388 | -236 | -191 |
| | 541 | 471 | 237 | 65 | 190 | 284 | 411 | 207 | 108 | 280 | 593 | 286 | 134 | 317 | 214 | 148 | 253 | 406 | 202 | 193 | 174 | 356 | 517 | 318 | 288 |
| 17 | 87 | 112 | 75 | 54 | 138 | 119 | 75 | 58 | 90 | 82 | 50 | 30 | 72 | 79 | 71 | 110 | 116 | 140 | 233 | 165 | 125 | 136 | 141 | 114 | 103 |
| | -138 | -102 | -137 | -44 | -85 | -329 | -149 | -41 | -71 | -274 | -102 | -14 | -64 | -374 | -249 | -399 | -279 | -246 | -443 | -325 | -192 | -235 | -335 | -316 | -206 |
| | 226 | 216 | 213 | 98 | 224 | 449 | 224 | 100 | 163 | 357 | 153 | 45 | 136 | 454 | 321 | 510 | 396 | 387 | 677 | 492 | 319 | 371 | 477 | 431 | 310 |
| 18 | 102 | 68 | 56 | 50 | 70 | 79 | 88 | 76 | 113 | 109 | 67 | 57 | 38 | 40 | 34 | 41 | 32 | 30 | 34 | 30 | 31 | 38 | 40 | 46 | 57 |
| | -121 | -21 | -20 | -59 | -147 | -65 | -62 | -144 | -234 | -103 | -164 | -142 | -50 | -19 | -46 | -106 | -34 | -49 | -59 | -53 | -10 | -39 | -30 | -38 | -76 |
| | 224 | 90 | 77 | 109 | 219 | 145 | 152 | 220 | 348 | 213 | 232 | 200 | 90 | 60 | 82 | 149 | 66 | 80 | 94 | 84 | 42 | 79 | 72 | 86 | 134 |
| 19 | 36 | 43 | 39 | 31 | 26 | 25 | 20 | 21 | 26 | 23 | 45 | 26 | 23 | 19 | 33 | 35 | 11 | 13 | 19 | 27 | 29 | 27 | 24 | 24 | 27 |
| | -18 | -31 | -83 | -20 | -1 | -6 | -12 | -13 | -15 | -15 | -18 | -95 | -60 | -24 | -26 | -113 | -23 | -60 | -18 | -6 | -7 | -4 | -3 | -4 | -28 |
| | 56 | 75 | 123 | 51 | 28 | 32 | 33 | 35 | 41 | 38 | 63 | 122 | 84 | 44 | 60 | 149 | 36 | 74 | 38 | 34 | 37 | 33 | 29 | 29 | 56 |
| 20 | 27 | 27 | 26 | 31 | 31 | 24 | 20 | 26 | 35 | 34 | 50 | 62 | 89 | 58 | 35 | 56 | 86 | 147 | 232 | 164 | 118 | 136 | 79 | 57 | 69 |
| | -1 | 0 | -6 | -12 | -14 | -18 | -25 | -28 | -19 | -11 | -23 | -104 | -169 | -69 | -106 | -123 | -223 | -296 | -480 | -274 | -66 | -16 | -27 | -16 | -89 |
| | 29 | 28 | 33 | 44 | 46 | 44 | 46 | 54 | 55 | 46 | 73 | 166 | 259 | 128 | 143 | 180 | 310 | 443 | 714 | 440 | 185 | 153 | 106 | 73 | 158 |
| 21 | 48 | 57 | 82 | 95 | 57 | 38 | 45 | 44 | 57 | 49 | 46 | 49 | 110 | 102 | 117 | 56 | 29 | 31 | 36 | 59 | 66 | 27 | 26 | 41 | 57 |
| | -37 | -36 | -136 | -111 | -10 | -2 | 1 | 0 | -14 | -7 | -13 | -14 | -103 | -155 | -88 | -20 | -40 | -36 | -64 | -78 | -53 | -13 | -11 | -12 | -44 |
| | 86 | 94 | 220 | 206 | 67 | 40 | 43 | 43 | 72 | 57 | 59 | 63 | 214 | 258 | 207 | 76 | 71 | 69 | 102 | 139 | 120 | 42 | 38 | 54 | 102 |
| 22 | 73 | 86 | 93 | 134 | 190 | 181 | 151 | 197 | 83 | 128 | 118 | 100 | 56 | 29 | 21 | 56 | 153 | 305 | 366 | 331 | 239 | 241 | 131 | 121 | 149 |
| | -58 | -360 | -237 | -248 | -311 | -237 | -147 | -152 | -217 | -108 | -88 | -65 | -32 | -3 | -17 | -23 | -125 | -623 | -730 | -529 | -284 | -205 | -326 | -797 | -247 |
| | 131 | 447 | 331 | 383 | 502 | 419 | 298 | 350 | 301 | 237 | 206 | 165 | 89 | 33 | 39 | 80 | 279 | 929 | 1098 | 862 | 525 | 447 | 457 | 918 | 397 |
| 23 | 164 | 131 | 122 | 119 | 107 | 113 | 118 | 191 | 145 | 132 | 105 | 84 | 127 | 69 | 17 | 29 | 49 | 48 | 43 | 30 | 25 | 23 | 18 | 25 | 85 |
| | -364 | -402 | -293 | -129 | -53 | -99 | -170 | -288 | -229 | -88 | -94 | -119 | -112 | -72 | -66 | -110 | -105 | -125 | -141 | -25 | -22 | -73 | -16 | -11 | -134 |
| | 528 | 533 | 416 | 250 | 161 | 212 | 290 | 480 | 376 | 221 | 200 | 204 | 240 | 142 | 84 | 140 | 155 | 174 | 185 | 55 | 48 | 97 | 35 | 37 | 219 |
| 24 | 21 | 25 | 105 | 127 | 177 | 99 | 68 | 39 | 44 | 38 | 36 | 34 | 26 | 32 | 29 | 29 | 28 | 28 | 30 | 29 | 36 | 40 | 31 | 22 | 49 |
| | -11 | -19 | -122 | -335 | -310 | -63 | -53 | -17 | -18 | -13 | -11 | -23 | -10 | 0 | -5 | -9 | -90 | -42 | 3 | -60 | -50 | -3 | -15 | -32 | -54 |
| | 33 | 44 | 228 | 463 | 487 | 162 | 121 | 57 | 63 | 52 | 47 | 58 | 37 | 32 | 34 | 38 | 119 | 71 | 26 | 89 | 87 | 43 | 47 | 55 | 104 |
| 25 | 22 | 17 | 26 | 42 | 102 | 163 | 151 | 269 | 348 | 325 | 125 | 169 | 225 | 198 | 269 | 365 | 340 | 296 | 248 | 207 | 227 | 185 | 158 | 166 | 193 |
| | -35 | -49 | -159 | -330 | -348 | -358 | -464 | -417 | -378 | -429 | -526 | -769 | -358 | -327 | -758 | -929 | -606 | -298 | -235 | -310 | -303 | -141 | -334 | -399 | -386 |
| | 57 | 66 | 186 | 372 | 451 | 522 | 616 | 687 | 727 | 755 | 652 | 939 | 584 | 526 | 1028 | 1296 | 947 | 595 | 484 | 518 | 531 | 327 | 492 | 565 | 580 |
| 26 | 99 | 52 | 72 | 107 | 139 | 182 | 200 | 312 | 346 | 343 | 140 | 149 | 117 | 105 | 59 | 39 | 25 | 95 | 91 | 68 | 34 | 38 | 35 | 34 | 120 |
| | -134 | -34 | -61 | -239 | -393 | -472 | -415 | -300 | -327 | -300 | -192 | -124 | -296 | -228 | -36 | -17 | -22 | -136 | -178 | -160 | -35 | -31 | -16 | -15 | -173 |
| | 234 | 87 | 134 | 348 | 533 | 655 | 616 | 613 | 673 | 645 | 333 | 273 | 415 | 335 | 97 | 57 | 47 | 232 | 270 | 230 | 70 | 70 | 52 | 49 | 294 |
| 27 | 35 | 42 | 21 | 25 | 34 | 49 | 30 | 42 | 37 | 46 | 57 | 41 | 35 | 50 | 64 | 19 | 65 | 138 | 132 | 177 | 132 | 150 | 74 | 64 | 65 |
| | -13 | -21 | -18 | -11 | -9 | -7 | -8 | -8 | -12 | -16 | -27 | -14 | -14 | -25 | -87 | -18 | -128 | -381 | -119 | -67 | -137 | -89 | -27 | -54 | -55 |
| | 48 | 63 | 40 | 37 | 43 | 56 | 39 | 51 | 49 | 63 | 84 | 56 | 50 | 76 | 152 | 38 | 194 | 521 | 253 | 246 | 270 | 240 | 102 | 119 | 120 |
| 28 | 144 | 187 | 83 | 50 | 37 | 23 | 26 | 92 | 101 | 106 | 115 | 85 | 99 | 74 | 46 | 46 | 53 | 76 | 106 | 116 | 89 | 146 | 164 | 132 | 91 |
| | -368 | -479 | -214 | -69 | -23 | -15 | -4 | -24 | -34 | -90 | -130 | -652 | -479 | -129 | -53 | -89 | -185 | -207 | -276 | -465 | -255 | -257 | -353 | -254 | -213 |
| | 512 | 667 | 298 | 119 | 60 | 39 | 31 | 117 | 136 | 197 | 247 | 738 | 579 | 204 | 101 | 136 | 239 | 284 | 383 | 582 | 346 | 404 | 518 | 387 | 305 |
| 29 | 141 | 188 | 120 | 133 | 189 | 103 | 69 | 59 | 67 | 71 | 109 | 171 | 163 | 151 | 316 | 231 | 191 | 232 | 325 | 245 | 174 | 158 | 140 | 89 | 160 |
| | -146 | -288 | -253 | -236 | -226 | -35 | -22 | -27 | -100 | -138 | -200 | -446 | -737 | -357 | -709 | -571 | -462 | -505 | -652 | -489 | -359 | -343 | -465 | -138 | -329 |
| | 288 | 477 | 374 | 370 | 415 | 138 | 92 | 88 | 168 | 210 | 311 | 619 | 901 | 510 | 1027 | 804 | 654 | 738 | 978 | 735 | 534 | 502 | 606 | 228 | 490 |
| 30 | 87 | 142 | 239 | 259 | 174 | 158 | 205 | 208 | 237 | 158 | 112 | 129 | 107 | 104 | 129 | 166 | 180 | 258 | 111 | 91 | 93 | 54 | 59 | 58 | 147 |
| | -156 | -674 | -721 | -549 | -310 | -116 | -313 | -664 | -612 | -339 | -347 | -496 | -344 | -247 | -477 | -669 | -699 | -699 | -226 | -114 | -254 | -167 | -90 | -157 | -393 |
| | 243 | 818 | 961 | 809 | 484 | 275 | 519 | 873 | 850 | 499 | 460 | 627 | 452 | 352 | 607 | 837 | 880 | 958 | 338 | 207 | 349 | 222 | 150 | 215 | 541 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES OCTOBER 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 79 | 68 | 43 | 37 | 46 | 46 | 72 | 92 | 111 | 92 | 110 | 65 | 46 | 41 | 66 | 41 | 56 | 68 | 55 | 70 | 64 | 60 | 45 | 41 | 63 |
| | AL | -440 | -198 | -109 | -95 | -141 | -26 | -193 | -457 | -335 | -178 | -251 | -100 | -77 | -201 | -124 | -215 | -313 | -300 | -160 | -100 | -231 | -168 | -66 | -119 | -192 |
| | AE | 520 | 267 | 153 | 132 | 188 | 73 | 266 | 550 | 446 | 271 | 362 | 166 | 125 | 243 | 192 | 257 | 369 | 369 | 217 | 171 | 295 | 230 | 112 | 162 | 255 |
| 2 | | 30 | 34 | 56 | 39 | 45 | 105 | 99 | 92 | 68 | 85 | 127 | 114 | 61 | 37 | 42 | 57 | 22 | 26 | 39 | 31 | 29 | 21 | 24 | 20 | 54 |
| | | -215 | -117 | -268 | -257 | -165 | -109 | -113 | -84 | -96 | -48 | -293 | -467 | -266 | -115 | -67 | -54 | -56 | -117 | -184 | -86 | -4 | -7 | -7 | -7 | -133 |
| | | 245 | 152 | 324 | 296 | 210 | 215 | 213 | 176 | 165 | 134 | 421 | 582 | 329 | 154 | 111 | 113 | 80 | 145 | 224 | 118 | 33 | 30 | 33 | 28 | 189 |
| 3 | | 17 | 16 | 20 | 30 | 35 | 56 | 87 | 151 | 185 | 184 | 241 | 116 | 230 | 393 | 312 | 275 | 338 | 231 | 256 | 241 | 235 | 207 | 109 | 65 | 168 |
| | | -5 | -21 | -25 | -27 | -105 | -162 | -146 | -397 | -511 | -341 | -421 | -591 | -743 | -1071 | -787 | -877 | -755 | -894 | -406 | -553 | -295 | -232 | -71 | -177 | -400 |
| | | 23 | 37 | 46 | 57 | 140 | 218 | 234 | 549 | 697 | 526 | 663 | 708 | 974 | 1465 | 1099 | 1153 | 1094 | 1126 | 664 | 795 | 530 | 440 | 181 | 242 | 569 |
| 4 | | 65 | 60 | 66 | 69 | 117 | 141 | 68 | 125 | 155 | 141 | 119 | 108 | 151 | 64 | 113 | 71 | 70 | 31 | 35 | 37 | 27 | 40 | 41 | 39 | 81 |
| | | -185 | -214 | -242 | -234 | -174 | -129 | -81 | -283 | -226 | -239 | -163 | -484 | -391 | -274 | -433 | -293 | -217 | -47 | -21 | -3 | -4 | -13 | -33 | -23 | -184 |
| | | 250 | 275 | 308 | 303 | 291 | 270 | 150 | 408 | 382 | 380 | 283 | 593 | 543 | 339 | 547 | 365 | 288 | 80 | 57 | 40 | 31 | 54 | 75 | 63 | 266 |
| 5 | | 28 | 22 | 26 | 32 | 27 | 41 | 36 | 61 | 36 | 73 | 82 | 101 | 91 | 83 | 62 | 48 | 45 | 57 | 40 | 29 | 36 | 54 | 64 | 46 | 51 |
| | | -8 | -9 | -10 | -35 | -124 | -76 | -26 | -62 | -81 | -77 | -256 | -304 | -201 | -167 | -131 | -46 | -44 | -59 | -45 | -23 | -18 | -67 | -45 | -14 | -80 |
| | | 37 | 33 | 37 | 68 | 151 | 117 | 62 | 124 | 119 | 150 | 339 | 406 | 292 | 251 | 195 | 95 | 90 | 116 | 86 | 53 | 55 | 121 | 110 | 61 | 132 |
| 6 | | 27 | 21 | 29 | 35 | 39 | 38 | 61 | 36 | 62 | 42 | 37 | 29 | 23 | 16 | 15 | 18 | 17 | 12 | 16 | 24 | 33 | 32 | 27 | 22 | 30 |
| | | -15 | -4 | -24 | -49 | -40 | -55 | -69 | -93 | -87 | -119 | -48 | -26 | -28 | -23 | -21 | -22 | -24 | -47 | -48 | -65 | -154 | -88 | -85 | -49 | -54 |
| | | 44 | 26 | 54 | 85 | 79 | 94 | 130 | 130 | 150 | 161 | 85 | 56 | 52 | 40 | 37 | 42 | 42 | 61 | 65 | 91 | 188 | 121 | 114 | 72 | 84 |
| 7 | | 24 | 26 | 22 | 20 | 30 | 48 | 85 | 85 | 69 | 88 | 104 | 129 | 80 | 141 | 89 | 64 | 40 | 21 | 25 | 15 | 23 | 27 | 14 | 35 | 54 |
| | | -16 | -20 | -45 | -26 | -12 | -17 | -161 | -133 | -49 | -41 | -102 | -266 | -272 | -676 | -225 | -20 | -18 | -20 | -7 | -2 | -11 | -23 | -19 | -52 | -93 |
| | | 41 | 46 | 67 | 46 | 42 | 66 | 247 | 220 | 120 | 129 | 207 | 395 | 354 | 817 | 316 | 85 | 59 | 42 | 33 | 17 | 35 | 52 | 34 | 89 | 148 |
| 8 | | 48 | 80 | 75 | 81 | 41 | 40 | 61 | 40 | 89 | 78 | 62 | 68 | 41 | 29 | 39 | 48 | 40 | 37 | 64 | 30 | 43 | 28 | 24 | 23 | 51 |
| | | -38 | -55 | -150 | -52 | -6 | -20 | -77 | -26 | -70 | -88 | -27 | -102 | -69 | -25 | -32 | -61 | -114 | -61 | -113 | -25 | -58 | -54 | -11 | -3 | -56 |
| | | 87 | 136 | 225 | 135 | 47 | 61 | 139 | 67 | 159 | 167 | 91 | 171 | 111 | 55 | 72 | 110 | 156 | 99 | 178 | 56 | 102 | 84 | 36 | 28 | 107 |
| 9 | | 18 | 14 | 12 | 15 | 27 | 33 | 22 | 17 | 18 | 17 | 14 | 14 | 13 | 16 | 18 | 18 | 19 | 18 | 19 | 48 | 137 | 141 | 144 | 235 | 44 |
| | | -5 | -5 | -4 | -5 | -7 | -6 | -5 | -6 | -12 | -15 | -19 | -24 | -28 | -30 | -29 | -32 | -30 | -20 | -34 | -140 | -170 | -197 | -203 | -193 | -51 |
| | | 25 | 20 | 17 | 21 | 35 | 40 | 27 | 24 | 30 | 33 | 34 | 38 | 42 | 47 | 48 | 51 | 50 | 40 | 54 | 189 | 308 | 339 | 347 | 429 | 95 |
| 10 | | 207 | 101 | 109 | 60 | 98 | 109 | 133 | 58 | 35 | 39 | 21 | 19 | 22 | 22 | 20 | 19 | 24 | 44 | 85 | 55 | 29 | 35 | 30 | 46 | 59 |
| | | -163 | -152 | -100 | -8 | -55 | -95 | -46 | -21 | 0 | -4 | -9 | -15 | -20 | -24 | -24 | -29 | -28 | -47 | -132 | -61 | -30 | -16 | -18 | -34 | -47 |
| | | 371 | 254 | 210 | 68 | 154 | 205 | 180 | 79 | 35 | 43 | 31 | 35 | 42 | 46 | 45 | 49 | 53 | 93 | 219 | 118 | 61 | 53 | 49 | 82 | 107 |
| 11 | | 50 | 71 | 114 | 93 | 147 | 133 | 149 | 88 | 55 | 94 | 95 | 65 | 46 | 25 | 121 | 256 | 280 | 242 | 217 | 303 | 215 | 243 | 77 | 63 | 135 |
| | | -28 | -73 | -225 | -218 | -158 | -176 | -373 | -51 | -1 | -71 | -55 | -4 | -13 | -21 | -174 | -665 | -771 | -510 | -494 | -409 | -392 | -153 | -42 | -58 | -214 |
| | | 79 | 144 | 339 | 312 | 305 | 310 | 524 | 141 | 57 | 166 | 151 | 69 | 60 | 47 | 296 | 921 | 1052 | 754 | 712 | 712 | 608 | 398 | 121 | 122 | 350 |
| 12 | | 36 | 39 | 43 | 34 | 36 | 23 | 22 | 23 | 33 | 24 | 16 | 15 | 15 | 23 | 44 | 21 | 32 | 27 | 44 | 34 | 27 | 22 | 59 | 46 | 31 |
| | | -55 | -22 | -14 | -7 | -16 | -9 | -9 | -12 | -13 | -10 | -14 | -22 | -28 | -36 | -78 | -246 | -53 | -48 | -72 | -57 | -18 | -16 | -52 | -76 | -41 |
| | | 92 | 63 | 58 | 42 | 53 | 33 | 32 | 37 | 47 | 34 | 31 | 39 | 44 | 60 | 124 | 269 | 86 | 76 | 117 | 92 | 46 | 40 | 111 | 123 | 73 |
| 13 | | 69 | 123 | 102 | 102 | 76 | 86 | 79 | 80 | 67 | 82 | 85 | 72 | 110 | 112 | 155 | 158 | 115 | 179 | 189 | 152 | 172 | 80 | 140 | 174 | 115 |
| | | -189 | -230 | -147 | -58 | -35 | -96 | -200 | -219 | -129 | -97 | -92 | -81 | -314 | -383 | -295 | -527 | -399 | -410 | -612 | -801 | -598 | -191 | -126 | -402 | -276 |
| | | 259 | 353 | 250 | 161 | 111 | 183 | 279 | 300 | 197 | 179 | 178 | 154 | 424 | 496 | 451 | 686 | 515 | 589 | 802 | 954 | 770 | 272 | 267 | 577 | 392 |
| 14 | | 145 | 134 | 194 | 161 | 134 | 95 | 121 | 204 | 124 | 107 | 90 | 118 | 88 | 97 | 69 | 198 | 138 | 126 | 103 | 143 | 82 | 80 | 78 | 73 | 121 |
| | | -542 | -256 | -325 | -385 | -227 | -120 | -409 | -467 | -435 | -143 | -57 | -365 | -97 | -250 | -246 | -632 | -457 | -508 | -222 | -246 | -282 | -150 | -198 | -169 | -299 |
| | | 687 | 390 | 520 | 546 | 362 | 216 | 531 | 672 | 560 | 251 | 148 | 484 | 186 | 348 | 315 | 831 | 596 | 635 | 325 | 390 | 365 | 231 | 277 | 243 | 421 |
| 15 | | 55 | 89 | 82 | 168 | 272 | 153 | 84 | 161 | 115 | 110 | 183 | 127 | 91 | 100 | 117 | 139 | 124 | 96 | 122 | 69 | 64 | 59 | 51 | 62 | 112 |
| | | -195 | -183 | -267 | -242 | -513 | -344 | -206 | -261 | -203 | -104 | -536 | -464 | -356 | -214 | -344 | -366 | -479 | -203 | -238 | -130 | -180 | -128 | -16 | -45 | -259 |
| | | 250 | 272 | 349 | 410 | 786 | 498 | 291 | 423 | 319 | 215 | 720 | 593 | 448 | 315 | 462 | 506 | 603 | 300 | 360 | 200 | 245 | 188 | 68 | 108 | 372 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 37 | 60 | 82 | 76 | 88 | 92 | 155 | 100 | 84 | 50 | 49 | 63 | 55 | 70 | 40 | 71 | 103 | 56 | 57 | 36 | 35 | 32 | 38 | 38 | 65 |
| | -11 | -47 | -93 | -161 | -106 | -128 | -467 | -189 | -18 | -25 | -28 | -58 | -113 | -100 | -218 | -198 | -307 | -104 | -68 | -61 | -155 | -107 | -85 | -46 | -121 |
| | 49 | 108 | 175 | 238 | 195 | 220 | 622 | 289 | 103 | 77 | 77 | 123 | 170 | 171 | 259 | 269 | 412 | 161 | 126 | 98 | 191 | 140 | 124 | 86 | 187 |
| 17 | 47 | 37 | 34 | 42 | 56 | 57 | 54 | 64 | 84 | 126 | 110 | 75 | 116 | 129 | 114 | 119 | 132 | 130 | 100 | 58 | 72 | 68 | 66 | 48 | 81 |
| | -56 | -99 | -87 | -66 | -33 | -21 | -10 | -6 | -22 | -185 | -234 | -122 | -124 | -656 | -610 | -293 | -307 | -311 | -333 | -34 | -158 | -232 | -158 | -81 | -177 |
| | 104 | 137 | 121 | 108 | 90 | 79 | 65 | 70 | 107 | 312 | 345 | 199 | 241 | 785 | 725 | 413 | 439 | 443 | 434 | 93 | 230 | 300 | 225 | 130 | 258 |
| 18 | 48 | 41 | 41 | 31 | 32 | 23 | 26 | 42 | 23 | 34 | 35 | 36 | 28 | 23 | 33 | 26 | 35 | 25 | 13 | 15 | 11 | 11 | 12 | 10 | 27 |
| | -48 | -10 | -13 | -16 | -12 | -5 | -5 | -13 | -54 | -139 | -46 | -124 | -97 | -21 | -17 | -43 | -63 | -28 | -8 | -7 | -15 | -8 | -7 | -9 | -34 |
| | 97 | 52 | 54 | 48 | 45 | 29 | 32 | 56 | 78 | 174 | 82 | 161 | 125 | 44 | 51 | 71 | 99 | 55 | 23 | 23 | 27 | 20 | 20 | 20 | 62 |
| 19 | 15 | 11 | 28 | 23 | 20 | 16 | 17 | 26 | 22 | 25 | 61 | 78 | 103 | 110 | 47 | 36 | 47 | 34 | 35 | 56 | 53 | 55 | 66 | 82 | 44 |
| | -11 | -29 | -32 | -30 | -43 | -28 | -6 | -9 | -7 | -11 | -37 | -153 | -286 | -162 | -48 | -52 | -184 | -132 | -62 | -37 | -64 | -34 | -23 | -76 | -65 |
| | 27 | 42 | 60 | 54 | 63 | 45 | 24 | 36 | 29 | 37 | 99 | 231 | 391 | 274 | 96 | 90 | 233 | 167 | 98 | 93 | 118 | 91 | 90 | 159 | 110 |
| 20 | 50 | 25 | 23 | 36 | 42 | 45 | 41 | 68 | 54 | 47 | 54 | 62 | 58 | 77 | 73 | 91 | 137 | 183 | 201 | 261 | 203 | 238 | 244 | 231 | 106 |
| | -26 | -10 | -6 | -15 | -14 | -8 | -21 | -2 | -3 | -33 | -60 | -24 | -23 | -22 | -113 | -274 | -366 | -396 | -361 | -358 | -253 | -477 | -278 | -208 | -140 |
| | 77 | 36 | 30 | 51 | 57 | 53 | 63 | 70 | 58 | 81 | 116 | 86 | 81 | 100 | 187 | 367 | 504 | 580 | 563 | 620 | 457 | 715 | 523 | 439 | 247 |
| 21 | 229 | 194 | 151 | 121 | 205 | 176 | 218 | 145 | 98 | 94 | 88 | 65 | 73 | 53 | 71 | 106 | 172 | 184 | 200 | 190 | 146 | 64 | 51 | 32 | 130 |
| | -181 | -236 | -222 | -200 | -150 | -169 | -100 | -85 | -33 | -100 | -61 | -17 | -63 | -300 | -423 | -275 | -169 | -304 | -394 | -410 | -237 | -33 | -10 | -8 | -174 |
| | 411 | 431 | 373 | 322 | 356 | 345 | 319 | 230 | 132 | 195 | 150 | 83 | 138 | 355 | 496 | 383 | 343 | 489 | 595 | 601 | 384 | 98 | 63 | 40 | 305 |
| 22 | 31 | 30 | 46 | 39 | 28 | 16 | 25 | 38 | 22 | 26 | 28 | 18 | 20 | 31 | 30 | 14 | 17 | 13 | 15 | 20 | 28 | 31 | 33 | 37 | 27 |
| | -22 | -21 | -47 | -37 | -25 | -5 | -4 | -16 | -7 | -5 | -8 | -13 | -33 | -22 | -22 | -23 | -19 | -14 | -4 | -3 | -3 | 0 | -1 | -61 | -17 |
| | 54 | 51 | 94 | 76 | 53 | 21 | 30 | 55 | 30 | 32 | 37 | 32 | 55 | 55 | 53 | 37 | 37 | 28 | 20 | 24 | 32 | 30 | 35 | 99 | 45 |
| 23 | 82 | 78 | 62 | 79 | 78 | 157 | 134 | 158 | 122 | 136 | 138 | 55 | 49 | 54 | 30 | 60 | 116 | 30 | 22 | 16 | 19 | 34 | 30 | 24 | 73 |
| | -259 | -240 | -203 | -187 | -107 | -294 | -220 | -136 | -150 | -196 | -142 | -31 | -33 | -121 | -134 | -174 | -399 | -51 | -36 | -59 | -103 | -70 | -19 | -8 | -140 |
| | 341 | 319 | 266 | 267 | 185 | 453 | 354 | 294 | 273 | 333 | 281 | 87 | 83 | 176 | 164 | 235 | 516 | 82 | 59 | 76 | 122 | 105 | 50 | 33 | 215 |
| 24 | 18 | 21 | 26 | 31 | 18 | 54 | 72 | 69 | 101 | 91 | 105 | 131 | 60 | 38 | 31 | 52 | 43 | 165 | 162 | 224 | 239 | 198 | 109 | 110 | 90 |
| | -7 | -38 | -187 | -126 | -30 | -31 | -147 | -189 | -120 | -228 | -363 | -196 | -50 | -50 | -135 | -172 | -173 | -331 | -570 | -548 | -343 | -233 | -158 | -134 | -190 |
| | 26 | 60 | 214 | 158 | 49 | 85 | 219 | 260 | 223 | 320 | 470 | 329 | 111 | 89 | 167 | 225 | 217 | 497 | 733 | 773 | 583 | 432 | 268 | 245 | 281 |
| 25 | 61 | 83 | 89 | 162 | 262 | 271 | 119 | 102 | 115 | 156 | 215 | 138 | 120 | 72 | 31 | 28 | 16 | 20 | 33 | 60 | 75 | 65 | 57 | 57 | 100 |
| | -598 | -590 | -489 | -367 | -411 | -429 | -146 | -113 | -307 | -624 | -540 | -565 | -414 | -462 | -213 | -42 | -82 | -111 | -276 | -302 | -278 | -385 | -195 | -90 | -335 |
| | 659 | 674 | 579 | 530 | 673 | 701 | 266 | 216 | 422 | 781 | 756 | 704 | 536 | 534 | 245 | 71 | 98 | 132 | 310 | 364 | 353 | 452 | 253 | 148 | 436 |
| 26 | 36 | 43 | 33 | 30 | 67 | 86 | 93 | 82 | 118 | 100 | 103 | 121 | 118 | 65 | 75 | 75 | 64 | 47 | 30 | 15 | 27 | 35 | 37 | 48 | 64 |
| | -40 | -93 | -48 | -83 | -171 | -210 | -291 | -203 | -266 | -143 | -251 | -403 | -345 | -186 | -234 | -190 | -279 | -299 | -137 | -60 | -11 | -46 | -85 | -134 | -175 |
| | 77 | 136 | 82 | 113 | 239 | 296 | 385 | 286 | 385 | 244 | 355 | 525 | 464 | 252 | 311 | 266 | 344 | 347 | 168 | 76 | 40 | 81 | 123 | 182 | 241 |
| 27 | 38 | 111 | 85 | 115 | 121 | 182 | 128 | 146 | 177 | 200 | 200 | 112 | 207 | 87 | 68 | 233 | 198 | 241 | 213 | 122 | 75 | 162 | 191 | 158 | 149 |
| | -67 | -165 | -396 | -495 | -357 | -368 | -396 | -387 | -525 | -632 | -511 | -485 | -470 | -95 | -239 | -923 | -547 | -433 | -603 | -637 | -258 | -387 | -344 | -356 | -420 |
| | 106 | 277 | 481 | 610 | 478 | 551 | 526 | 534 | 704 | 833 | 713 | 598 | 679 | 184 | 307 | 1156 | 746 | 675 | 816 | 759 | 334 | 549 | 536 | 514 | 570 |
| 28 | 130 | 122 | 138 | 98 | 239 | 221 | 176 | 192 | 149 | 122 | 125 | 209 | 125 | 104 | 149 | 140 | 238 | 208 | 180 | 104 | 101 | 110 | 49 | 98 | 147 |
| | -691 | -419 | -168 | -141 | -346 | -683 | -454 | -402 | -343 | -221 | -835 | -555 | -596 | -431 | -544 | -407 | -425 | -577 | -589 | -358 | -358 | -285 | -54 | -187 | -419 |
| | 821 | 542 | 306 | 240 | 585 | 905 | 631 | 594 | 492 | 344 | 961 | 766 | 723 | 536 | 694 | 548 | 664 | 786 | 770 | 462 | 459 | 396 | 104 | 286 | 567 |
| 29 | 79 | 112 | 67 | 63 | 89 | 88 | 74 | 76 | 69 | 73 | 86 | 74 | 93 | 84 | 67 | 60 | 54 | 70 | 62 | 72 | 80 | 100 | 89 | 104 | 79 |
| | -420 | -319 | -170 | -194 | -250 | -82 | -97 | -207 | -144 | -222 | -569 | -480 | -208 | -384 | -504 | -393 | -243 | -258 | -240 | -186 | -137 | -196 | -79 | -246 | -259 |
| | 500 | 432 | 237 | 257 | 340 | 171 | 172 | 284 | 214 | 296 | 656 | 556 | 303 | 469 | 572 | 454 | 299 | 328 | 303 | 258 | 218 | 296 | 168 | 351 | 339 |
| 30 | 81 | 108 | 99 | 63 | 111 | 86 | 85 | 126 | 113 | 151 | 104 | 91 | 39 | 42 | 35 | 18 | 15 | 14 | 9 | 20 | 33 | 41 | 39 | 37 | 65 |
| | -247 | -195 | -145 | -155 | -263 | -329 | -219 | -248 | -266 | -347 | -420 | -209 | -65 | -158 | -166 | -30 | -27 | -71 | -76 | -38 | -48 | -187 | -99 | -62 | -170 |
| | 328 | 303 | 244 | 218 | 374 | 415 | 305 | 376 | 381 | 499 | 525 | 302 | 106 | 202 | 202 | 49 | 43 | 86 | 86 | 59 | 82 | 229 | 139 | 100 | 236 |
| 31 | 29 | 37 | 23 | 32 | 41 | 106 | 89 | 119 | 86 | 92 | 79 | 65 | 45 | 32 | 28 | 29 | 31 | 48 | 92 | 114 | 116 | 72 | 57 | 46 | 63 |
| | -50 | -68 | -32 | -20 | -39 | -157 | -233 | -217 | -264 | -222 | -156 | -184 | -59 | -44 | -167 | -283 | -150 | -143 | -233 | -399 | -226 | -83 | -87 | -87 | -150 |
| | 80 | 106 | 55 | 53 | 81 | 263 | 323 | 337 | 352 | 315 | 235 | 250 | 105 | 77 | 196 | 313 | 182 | 192 | 326 | 514 | 343 | 156 | 146 | 134 | 214 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES NOVEMBER 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 37 | 33 | 53 | 76 | 56 | 74 | 72 | 108 | 74 | 69 | 134 | 171 | 117 | 84 | 35 | 18 | 12 | 17 | 17 | 12 | 21 | 19 | 18 | 11 | 56 |
| | AL | -108 | -135 | -230 | -305 | -131 | -140 | -220 | -211 | -171 | -248 | -217 | -196 | -152 | -167 | -226 | -189 | -119 | -250 | -168 | -112 | -17 | -7 | -7 | -8 | -156 |
| | AE | 145 | 168 | 284 | 381 | 187 | 215 | 293 | 321 | 246 | 318 | 351 | 367 | 270 | 252 | 262 | 208 | 133 | 268 | 187 | 125 | 39 | 27 | 26 | 20 | 212 |
| 2 | | 16 | 45 | 43 | 65 | 102 | 167 | 129 | 109 | 123 | 113 | 75 | 164 | 175 | 119 | 142 | 161 | 235 | 312 | 192 | 171 | 329 | 182 | 83 | 91 | 139 |
| | | -19 | -107 | -191 | -176 | -179 | -119 | -74 | -258 | -229 | -133 | -144 | -259 | -360 | -463 | -319 | -495 | -856 | -644 | -495 | -649 | -456 | -479 | -218 | -158 | -312 |
| | | 36 | 152 | 234 | 242 | 282 | 287 | 204 | 368 | 353 | 246 | 219 | 424 | 536 | 583 | 463 | 657 | 1092 | 958 | 689 | 821 | 786 | 662 | 302 | 251 | 452 |
| 3 | | 104 | 94 | 73 | 69 | 67 | 116 | 103 | 53 | 33 | 36 | 63 | 64 | 67 | 87 | 80 | 74 | 86 | 162 | 92 | 200 | 106 | 182 | 164 | 148 | 97 |
| | | -135 | -303 | -237 | -86 | -39 | -79 | -155 | -176 | -78 | -42 | -22 | -67 | -141 | -319 | -176 | -139 | -238 | -373 | -539 | -442 | -262 | -528 | -363 | -223 | -215 |
| | | 240 | 397 | 311 | 155 | 107 | 196 | 259 | 230 | 113 | 79 | 86 | 131 | 209 | 406 | 256 | 214 | 325 | 536 | 633 | 643 | 370 | 711 | 528 | 372 | 313 |
| 4 | | 106 | 59 | 44 | 27 | 25 | 22 | 30 | 24 | 0 | 2 | 9 | 20 | 17 | 9 | 7 | 1 | 11 | 17 | 15 | 22 | 44 | 33 | 28 | 25 | 25 |
| | | -144 | -54 | -23 | -22 | -24 | -30 | -45 | -57 | -31 | -23 | -28 | -33 | -27 | -26 | -28 | -37 | -77 | -105 | -53 | -52 | -26 | -35 | -84 | -73 | -47 |
| | | 251 | 113 | 69 | 51 | 50 | 53 | 76 | 83 | 31 | 25 | 38 | 53 | 45 | 36 | 36 | 38 | 89 | 124 | 69 | 75 | 71 | 70 | 114 | 99 | 73 |
| 5 | | 60 | 40 | 16 | 7 | 15 | 24 | 34 | 28 | 26 | 19 | 41 | 44 | 26 | 32 | 40 | 29 | 114 | 108 | 136 | 151 | 202 | 132 | 132 | 118 | 65 |
| | | -64 | -34 | -9 | -11 | -11 | -23 | -29 | -17 | -13 | -15 | -18 | -23 | -18 | -24 | -22 | -52 | -211 | -255 | -192 | -200 | -142 | -152 | -258 | -90 | -78 |
| | | 126 | 75 | 27 | 19 | 27 | 48 | 64 | 47 | 40 | 35 | 60 | 67 | 44 | 56 | 64 | 83 | 326 | 364 | 328 | 352 | 345 | 285 | 391 | 210 | 145 |
| 6 | | 115 | 196 | 117 | 84 | 118 | 175 | 175 | 101 | 97 | 96 | 63 | 17 | 14 | 47 | 88 | 86 | 25 | 10 | 37 | 43 | 11 | 17 | 48 | 56 | 77 |
| | | -90 | -87 | -86 | -142 | -201 | -112 | -62 | -72 | -61 | -91 | -165 | -23 | -24 | -60 | -146 | -73 | -25 | -29 | -66 | -57 | -20 | -21 | -41 | -38 | -75 |
| | | 206 | 284 | 204 | 226 | 319 | 288 | 238 | 175 | 160 | 189 | 229 | 41 | 39 | 108 | 235 | 159 | 51 | 40 | 105 | 101 | 33 | 39 | 90 | 96 | 152 |
| 7 | | 18 | 2 | 4 | 28 | 23 | 10 | 10 | 10 | 10 | 6 | 11 | 5 | 7 | 7 | 9 | 7 | 4 | 3 | 3 | 7 | 10 | 11 | 13 | 11 | 10 |
| | | -12 | -6 | -8 | -13 | -3 | -5 | -3 | -6 | -9 | -5 | -8 | -11 | -13 | -13 | -20 | -26 | -24 | -21 | -13 | -13 | -14 | -14 | -10 | -9 | -12 |
| | | 32 | 9 | 12 | 42 | 27 | 16 | 14 | 17 | 20 | 13 | 19 | 17 | 20 | 21 | 30 | 34 | 29 | 25 | 18 | 21 | 25 | 26 | 23 | 21 | 22 |
| 8 | | 11 | 13 | 19 | 19 | 27 | 33 | 66 | 26 | 17 | 13 | 21 | 23 | 18 | 20 | 42 | 30 | 19 | 19 | 21 | 10 | 11 | 9 | 12 | 15 | 21 |
| | | -7 | -7 | -24 | -8 | 0 | -5 | -32 | -37 | -19 | -18 | -22 | -11 | -18 | -19 | -26 | -28 | -38 | -17 | -15 | -11 | -11 | -9 | -9 | -6 | -16 |
| | | 19 | 22 | 45 | 28 | 28 | 39 | 100 | 64 | 36 | 32 | 44 | 34 | 36 | 40 | 70 | 59 | 58 | 37 | 36 | 21 | 23 | 19 | 22 | 22 | 39 |
| 9 | | 16 | 16 | 11 | 20 | 21 | 24 | 29 | 57 | 71 | 68 | 38 | 46 | 99 | 144 | 113 | 74 | 31 | 32 | 50 | 112 | 81 | 135 | 159 | 175 | 68 |
| | | -4 | -4 | -1 | -3 | -1 | -4 | -8 | -22 | -52 | -104 | -5 | -19 | -133 | -205 | -102 | -87 | -88 | -73 | -97 | -241 | -138 | -65 | -375 | -511 | -98 |
| | | 22 | 22 | 14 | 23 | 23 | 29 | 38 | 80 | 124 | 174 | 45 | 66 | 232 | 349 | 216 | 161 | 119 | 105 | 148 | 354 | 220 | 201 | 535 | 686 | 166 |
| 10 | | 165 | 146 | 111 | 81 | 96 | 120 | 148 | 59 | 26 | 57 | 129 | 130 | 62 | 44 | 39 | 30 | 17 | 7 | 10 | 22 | 23 | 45 | 63 | 94 | 72 |
| | | -373 | -160 | -73 | -23 | -55 | -125 | -245 | -41 | -13 | -38 | -220 | -321 | -85 | -41 | -28 | -78 | -25 | -18 | -21 | -49 | -42 | -39 | -46 | -44 | -92 |
| | | 540 | 306 | 185 | 105 | 151 | 247 | 394 | 101 | 41 | 97 | 349 | 451 | 147 | 86 | 68 | 109 | 43 | 26 | 32 | 71 | 66 | 86 | 111 | 140 | 165 |
| 11 | | 79 | 73 | 43 | 94 | 126 | 104 | 142 | 169 | 133 | 122 | 80 | 54 | 27 | 14 | 14 | 16 | 34 | 32 | 51 | 49 | 72 | 79 | 92 | 67 | 74 |
| | | -20 | -20 | -158 | -260 | -139 | -179 | -214 | -85 | -59 | -23 | -68 | -207 | -47 | -20 | -30 | -80 | -155 | -48 | -109 | -34 | -86 | -170 | -383 | -467 | -128 |
| | | 101 | 95 | 202 | 354 | 266 | 284 | 357 | 255 | 193 | 147 | 149 | 262 | 75 | 35 | 45 | 98 | 190 | 81 | 161 | 84 | 160 | 251 | 477 | 535 | 202 |
| 12 | | 90 | 111 | 108 | 93 | 43 | 42 | 76 | 116 | 105 | 89 | 51 | 41 | 50 | 40 | 19 | 16 | 28 | 30 | 25 | 88 | 121 | 169 | 143 | 141 | 77 |
| | | -484 | -366 | -241 | -63 | -5 | -12 | -51 | -220 | -224 | -173 | -37 | -87 | -43 | -26 | -43 | -51 | -159 | -120 | -55 | -310 | -369 | -198 | -286 | -255 | -162 |
| | | 575 | 478 | 349 | 157 | 49 | 55 | 128 | 337 | 330 | 264 | 88 | 129 | 93 | 67 | 62 | 68 | 189 | 151 | 81 | 399 | 492 | 368 | 430 | 398 | 239 |
| 13 | | 124 | 140 | 147 | 125 | 142 | 136 | 141 | 88 | 80 | 132 | 172 | 112 | 71 | 84 | 163 | 64 | 131 | 50 | 26 | 40 | 46 | 80 | 94 | 114 | 104 |
| | | -163 | -150 | -305 | -295 | -107 | -65 | -170 | -244 | -229 | -318 | -450 | -400 | -631 | -275 | -626 | -324 | -624 | -265 | -111 | -70 | -100 | -189 | -128 | -229 | -269 |
| | | 288 | 291 | 452 | 420 | 250 | 202 | 311 | 334 | 309 | 451 | 623 | 512 | 702 | 361 | 790 | 390 | 756 | 317 | 139 | 111 | 147 | 270 | 223 | 344 | 375 |
| 14 | | 72 | 68 | 65 | 73 | 84 | 78 | 104 | 104 | 76 | 90 | 89 | 205 | 122 | 96 | 15 | 21 | 92 | 130 | 91 | 44 | 64 | 51 | 76 | 59 | 82 |
| | | -120 | -97 | -32 | -54 | -202 | -226 | -46 | -72 | -176 | -320 | -321 | -328 | -360 | -158 | -36 | -108 | -431 | -611 | -190 | -68 | -73 | -164 | -174 | -152 | -188 |
| | | 193 | 166 | 98 | 127 | 287 | 304 | 151 | 177 | 253 | 410 | 411 | 533 | 483 | 255 | 53 | 130 | 524 | 742 | 282 | 113 | 138 | 216 | 251 | 212 | 271 |
| 15 | | 54 | 83 | 60 | 58 | 102 | 57 | 76 | 82 | 66 | 58 | 57 | 54 | 30 | 19 | 27 | 31 | 34 | 36 | 28 | 47 | 22 | 36 | 26 | 22 | 49 |
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| | | 154 | 379 | 177 | 82 | 167 | 115 | 191 | 227 | 162 | 96 | 137 | 263 | 73 | 84 | 158 | 289 | 173 | 360 | 377 | 413 | 276 | 142 | 101 | 42 | 193 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 26 | 32 | 28 | 32 | 56 | 69 | 37 | 36 | 43 | 59 | 50 | 45 | 13 | 15 | 39 | 20 | 33 | 13 | 13 | 7 | 15 | 13 | 6 | 4 | 29 |
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| | 46 | 151 | 179 | 163 | 213 | 219 | 46 | 42 | 59 | 107 | 90 | 88 | 28 | 35 | 97 | 210 | 180 | 141 | 66 | 48 | 41 | 44 | 23 | 28 | 98 |
| 17 | 17 | 14 | 11 | 16 | 16 | 23 | 31 | 28 | 36 | 34 | 19 | 16 | 11 | 10 | 4 | 3 | 4 | 5 | 9 | 13 | 14 | 14 | 14 | 15 | 16 |
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| | 34 | 28 | 27 | 22 | 34 | 32 | 41 | 39 | 61 | 72 | 39 | 27 | 24 | 24 | 21 | 19 | 18 | 26 | 27 | 41 | 27 | 26 | 22 | 20 | 31 |
| 18 | 13 | 14 | 20 | 21 | 49 | 61 | 53 | 60 | 39 | 40 | 19 | 13 | 25 | 23 | 11 | 33 | 11 | 13 | 16 | 33 | 36 | 22 | 34 | 23 | 28 |
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| | 22 | 24 | 31 | 32 | 101 | 84 | 65 | 127 | 97 | 52 | 29 | 29 | 43 | 45 | 26 | 48 | 22 | 29 | 28 | 112 | 201 | 81 | 91 | 61 | 62 |
| 19 | 22 | 17 | 17 | 31 | 79 | 115 | 218 | 153 | 128 | 102 | 146 | 132 | 47 | 30 | 35 | 66 | 100 | 57 | 44 | 51 | 30 | 21 | 18 | 16 | 70 |
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| | 76 | 24 | 22 | 89 | 338 | 402 | 369 | 364 | 286 | 390 | 371 | 390 | 98 | 172 | 275 | 317 | 432 | 229 | 176 | 128 | 84 | 88 | 81 | 41 | 218 |
| 20 | 21 | 36 | 52 | 54 | 68 | 94 | 88 | 61 | 35 | 53 | 27 | 17 | 13 | 14 | 23 | 43 | 36 | 45 | 50 | 136 | 102 | 68 | 53 | 68 | 52 |
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| | 114 | 149 | 177 | 215 | 286 | 366 | 456 | 220 | 80 | 167 | 144 | 37 | 30 | 45 | 176 | 393 | 281 | 421 | 374 | 428 | 204 | 150 | 115 | 219 | 219 |
| 21 | 69 | 76 | 77 | 58 | 59 | 50 | 46 | 26 | 54 | 60 | 47 | 24 | 24 | 14 | 11 | 6 | 5 | 3 | 6 | 4 | 4 | 3 | 7 | 12 | 31 |
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| | 298 | 176 | 152 | 144 | 157 | 307 | 286 | 172 | 109 | 358 | 196 | 66 | 80 | 53 | 29 | 43 | 30 | 33 | 88 | 89 | 18 | 16 | 16 | 28 | 123 |
| 22 | 26 | 26 | 35 | 63 | 84 | 99 | 94 | 64 | 79 | 73 | 55 | 35 | 28 | 25 | 32 | 17 | 13 | 14 | 26 | 35 | 57 | 64 | 58 | 51 | 48 |
| | -39 | -35 | -36 | -56 | -198 | -68 | -62 | -103 | -121 | -81 | -184 | -141 | -28 | -34 | -67 | -199 | -162 | -99 | -110 | -117 | -122 | -289 | -134 | -81 | -107 |
| | 67 | 63 | 71 | 119 | 283 | 168 | 157 | 169 | 202 | 154 | 240 | 176 | 56 | 60 | 99 | 216 | 176 | 115 | 137 | 153 | 181 | 354 | 193 | 133 | 156 |
| 23 | 28 | 27 | 70 | 138 | 107 | 102 | 102 | 213 | 348 | 361 | 344 | 133 | 173 | 136 | 73 | 72 | 36 | 101 | 166 | 153 | 182 | 142 | 128 | 113 | 144 |
| | -48 | -97 | -184 | -228 | -147 | -83 | -211 | -524 | -876 | -981 | -548 | -340 | -1023 | -320 | -103 | -295 | -257 | -274 | -574 | -621 | -368 | -309 | -255 | -531 | -383 |
| | 76 | 125 | 254 | 366 | 255 | 185 | 314 | 738 | 1225 | 1342 | 893 | 474 | 1196 | 458 | 177 | 368 | 294 | 377 | 741 | 775 | 552 | 453 | 385 | 644 | 528 |
| 24 | 120 | 98 | 76 | 80 | 85 | 82 | 151 | 138 | 146 | 193 | 164 | 95 | 106 | 158 | 184 | 111 | 55 | 50 | 59 | 44 | 54 | 88 | 68 | 76 | 103 |
| | -418 | -225 | -211 | -228 | -204 | -145 | -398 | -337 | -375 | -988 | -648 | -716 | -878 | -596 | -832 | -504 | -474 | -189 | -65 | -47 | -112 | -227 | -246 | -265 | -389 |
| | 539 | 323 | 287 | 309 | 290 | 228 | 551 | 476 | 522 | 1182 | 812 | 811 | 986 | 756 | 1018 | 616 | 530 | 240 | 125 | 93 | 168 | 316 | 316 | 343 | 493 |
| 25 | 30 | 17 | 27 | 23 | 55 | 89 | 131 | 95 | 28 | 36 | 18 | 13 | 31 | 15 | 132 | 66 | 37 | 32 | 17 | 4 | 22 | 32 | 41 | 43 | 43 |
| | -141 | -76 | -89 | -83 | -115 | -301 | -277 | -112 | -48 | -42 | -113 | -64 | -161 | -427 | -481 | -323 | -77 | -64 | -100 | -214 | -241 | -199 | -139 | -108 | -166 |
| | 172 | 93 | 116 | 107 | 171 | 392 | 410 | 208 | 77 | 79 | 132 | 77 | 192 | 441 | 614 | 390 | 115 | 97 | 119 | 219 | 264 | 232 | 182 | 152 | 210 |
| 26 | 45 | 67 | 73 | 60 | 61 | 99 | 100 | 55 | 54 | 123 | 124 | 50 | 67 | 108 | 66 | 38 | 47 | 104 | 40 | 31 | 22 | 18 | 25 | 50 | 64 |
| | -118 | -338 | -170 | -177 | -163 | -282 | -80 | -167 | -233 | -212 | -253 | -158 | -625 | -513 | -309 | -112 | -183 | -401 | -93 | -30 | -27 | -32 | -115 | -361 | -215 |
| | 164 | 406 | 244 | 237 | 225 | 382 | 182 | 223 | 288 | 336 | 378 | 209 | 692 | 621 | 376 | 151 | 232 | 507 | 135 | 62 | 50 | 51 | 141 | 412 | 279 |
| 27 | 44 | 60 | 53 | 84 | 119 | 160 | 186 | 133 | 157 | 137 | 102 | 86 | 116 | 63 | 122 | 103 | 132 | 126 | 55 | 31 | 32 | 10 | 10 | 40 | 90 |
| | -208 | -265 | -438 | -487 | -453 | -358 | -352 | -361 | -542 | -423 | -473 | -475 | -278 | -138 | -595 | -318 | -502 | -347 | -80 | -30 | -56 | -89 | -30 | -32 | -305 |
| | 253 | 325 | 492 | 572 | 573 | 519 | 540 | 494 | 699 | 560 | 576 | 561 | 395 | 201 | 718 | 422 | 634 | 474 | 137 | 62 | 90 | 100 | 42 | 72 | 396 |
| 28 | 8 | 15 | 44 | 34 | 61 | 78 | 56 | 34 | 28 | 40 | 107 | 99 | 118 | 82 | 50 | 47 | 30 | 43 | 56 | 35 | 38 | 36 | 24 | 31 | 50 |
| | -34 | -51 | -92 | -141 | -172 | -185 | -155 | -81 | -45 | -127 | -449 | -254 | -179 | -66 | -29 | -96 | -45 | -175 | -186 | -163 | -5 | -34 | -33 | -28 | -118 |
| | 43 | 67 | 136 | 176 | 234 | 263 | 213 | 116 | 74 | 169 | 556 | 354 | 299 | 149 | 79 | 144 | 77 | 219 | 244 | 199 | 44 | 71 | 58 | 60 | 169 |
| 29 | 24 | 26 | 24 | 19 | 13 | 16 | 10 | 4 | 3 | 2 | 3 | 5 | 1 | 0 | 1 | 1 | 5 | 4 | 3 | 2 | 2 | 2 | 3 | 4 | 7 |
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| | 38 | 34 | 33 | 27 | 24 | 31 | 19 | 11 | 9 | 9 | 16 | 15 | 14 | 12 | 16 | 21 | 27 | 21 | 18 | 16 | 12 | 13 | 17 | 18 | 20 |
| 30 | 3 | 4 | 6 | 4 | 4 | 5 | 5 | 7 | 4 | 6 | 5 | 10 | 6 | 5 | 5 | 8 | 10 | 16 | 18 | 28 | 20 | 18 | 12 | 22 | 10 |
| | -10 | -8 | -6 | -4 | -4 | -5 | -7 | -2 | -13 | -4 | -4 | -9 | -14 | -12 | -12 | -15 | -15 | -11 | -29 | -81 | -9 | -13 | -7 | -9 | -13 |
| | 14 | 13 | 13 | 9 | 9 | 10 | 13 | 10 | 18 | 11 | 10 | 20 | 21 | 18 | 18 | 24 | 26 | 28 | 48 | 109 | 30 | 32 | 20 | 32 | 23 |

HOURLY VALUES (nT) OF AU, AL AND AE INDICES — DECEMBER 1987

| DAY\UT | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AU | 28 | 35 | 28 | 28 | 20 | 21 | 25 | 35 | 38 | 29 | 41 | 60 | 77 | 103 | 58 | 58 | 28 | 22 | 22 | 54 | 25 | 19 | 18 | 19 | 37 |
| | AL | -12 | -9 | -2 | -6 | -2 | -3 | -11 | -45 | -15 | -5 | -22 | -137 | -85 | -87 | -63 | -88 | -50 | -13 | -34 | -129 | -56 | -31 | -16 | -8 | -39 |
| | AE | 41 | 45 | 31 | 36 | 24 | 25 | 37 | 81 | 54 | 34 | 63 | 198 | 163 | 192 | 122 | 147 | 79 | 36 | 58 | 184 | 82 | 51 | 36 | 28 | 77 |
| 2 | | 16 | 14 | 17 | 22 | 36 | 62 | 66 | 38 | 32 | 15 | 18 | 13 | 12 | 11 | 11 | 7 | 5 | 6 | 10 | 16 | 12 | 11 | 16 | 28 | 21 |
| | | -12 | -10 | -5 | -7 | -12 | -5 | -1 | 0 | -2 | -3 | -7 | -5 | -6 | -7 | -6 | -13 | -11 | -9 | -9 | -33 | -16 | -15 | -22 | -32 | -10 |
| | | 29 | 26 | 23 | 31 | 49 | 67 | 68 | 39 | 35 | 19 | 26 | 19 | 18 | 19 | 18 | 20 | 16 | 15 | 21 | 51 | 29 | 27 | 40 | 60 | 32 |
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| | | 154 | 187 | 165 | 94 | 124 | 286 | 233 | 91 | 58 | 39 | 23 | 50 | 39 | 41 | 416 | 699 | 376 | 107 | 83 | 128 | 155 | 164 | 148 | 252 | 171 |
| 4 | | 48 | 36 | 20 | 18 | 18 | 32 | 35 | 73 | 96 | 54 | 38 | 34 | 17 | 13 | 35 | 27 | 16 | 83 | 30 | 80 | 64 | 90 | 122 | 186 | 53 |
| | | -59 | -10 | -12 | -11 | -13 | -12 | -12 | -65 | -52 | -4 | -8 | -12 | -17 | -17 | -23 | -42 | -104 | -186 | -143 | -132 | -89 | -70 | -298 | -519 | -79 |
| | | 108 | 47 | 33 | 30 | 32 | 45 | 47 | 138 | 148 | 60 | 47 | 48 | 35 | 31 | 59 | 70 | 121 | 270 | 174 | 213 | 154 | 161 | 421 | 706 | 133 |
| 5 | | 208 | 118 | 57 | 49 | 56 | 95 | 104 | 76 | 186 | 89 | 38 | 31 | 41 | 92 | 81 | 54 | 44 | 87 | 113 | 133 | 60 | 34 | 29 | 17 | 79 |
| | | -414 | -214 | -115 | -116 | -112 | -274 | -281 | -386 | -586 | -133 | -23 | -35 | -58 | -86 | -73 | -68 | -160 | -114 | -174 | -58 | -33 | -29 | -29 | -33 | -150 |
| | | 624 | 334 | 174 | 166 | 168 | 369 | 385 | 463 | 773 | 222 | 62 | 66 | 99 | 179 | 155 | 123 | 205 | 202 | 288 | 192 | 93 | 64 | 59 | 51 | 230 |
| 6 | | 12 | 15 | 13 | 36 | 50 | 107 | 70 | 43 | 46 | 62 | 46 | 31 | 30 | 22 | 31 | 72 | 67 | 48 | 35 | 47 | 35 | 59 | 70 | 54 | 46 |
| | | -38 | -51 | -73 | -69 | -131 | -55 | -16 | -28 | -44 | -29 | -16 | -15 | -10 | -19 | -94 | -150 | -81 | -86 | -119 | -91 | -50 | -146 | -113 | -46 | -65 |
| | | 51 | 67 | 86 | 105 | 182 | 163 | 86 | 71 | 91 | 92 | 63 | 47 | 40 | 43 | 126 | 223 | 149 | 135 | 155 | 139 | 87 | 206 | 184 | 100 | 112 |
| 7 | | 24 | 29 | 37 | 39 | 27 | 27 | 35 | 22 | 16 | 16 | 11 | 10 | 9 | 17 | 26 | 43 | 41 | 38 | 16 | 8 | 17 | 12 | 9 | 14 | 23 |
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| | | 38 | 64 | 81 | 89 | 36 | 40 | 66 | 49 | 27 | 54 | 24 | 40 | 55 | 48 | 157 | 176 | 155 | 110 | 101 | 54 | 48 | 27 | 30 | 29 | 66 |
| 8 | | 13 | 12 | 15 | 10 | 16 | 10 | 6 | 11 | 11 | 13 | 16 | 10 | 13 | 9 | 6 | 7 | 7 | 6 | 5 | 6 | 6 | 7 | 9 | 10 | 10 |
| | | -6 | -6 | -7 | -4 | -3 | -4 | -6 | -3 | -3 | -4 | -3 | -4 | -6 | -8 | -12 | -13 | -12 | -16 | -14 | -14 | -8 | -8 | -9 | -6 | -7 |
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| 9 | | 12 | 13 | 15 | 16 | 18 | 18 | 18 | 19 | 17 | 18 | 20 | 20 | 9 | 9 | 9 | 17 | 16 | 13 | 10 | 15 | 26 | 93 | 117 | 136 | 28 |
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| 10 | | 93 | 60 | 66 | 68 | 64 | 54 | 64 | 87 | 88 | 78 | 75 | 74 | 45 | 69 | 169 | 274 | 118 | 178 | 146 | 180 | 177 | 162 | 142 | 140 | 111 |
| | | -23 | -13 | -10 | -27 | -32 | -21 | -58 | -92 | -97 | -189 | -348 | -343 | -119 | -91 | -396 | -831 | -442 | -513 | -326 | -516 | -506 | -298 | -176 | -73 | -231 |
| | | 117 | 74 | 78 | 97 | 97 | 76 | 123 | 180 | 186 | 268 | 424 | 418 | 165 | 162 | 567 | 1106 | 561 | 692 | 473 | 697 | 684 | 461 | 320 | 214 | 343 |
| 11 | | 121 | 121 | 162 | 104 | 19 | 38 | 30 | 17 | 18 | 15 | 17 | 17 | 17 | 40 | 17 | 38 | 92 | 62 | 79 | 72 | 78 | 61 | 50 | 87 | 57 |
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| | | 332 | 577 | 352 | 148 | 50 | 96 | 47 | 34 | 33 | 50 | 79 | 129 | 80 | 180 | 111 | 447 | 283 | 238 | 470 | 282 | 211 | 136 | 157 | 188 | 196 |
| 12 | | 96 | 91 | 85 | 101 | 88 | 113 | 106 | 87 | 73 | 61 | 91 | 79 | 123 | 104 | 57 | 51 | 37 | 32 | 22 | 24 | 25 | 15 | 13 | 13 | 66 |
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| | | 264 | 151 | 124 | 109 | 113 | 207 | 194 | 120 | 127 | 107 | 296 | 201 | 209 | 170 | 159 | 193 | 144 | 76 | 103 | 132 | 79 | 51 | 40 | 28 | 142 |
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| | | 25 | 33 | 23 | 23 | 21 | 24 | 27 | 76 | 114 | 115 | 140 | 93 | 52 | 51 | 111 | 89 | 120 | 52 | 38 | 69 | 47 | 66 | 22 | 27 | 61 |
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| | | 28 | 26 | 17 | 38 | 52 | 35 | 24 | 87 | 136 | 124 | 116 | 66 | 70 | 157 | 110 | 64 | 46 | 96 | 57 | 86 | 54 | 165 | 32 | 31 | 71 |
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| | | -12 | -4 | -4 | -9 | -3 | -5 | -5 | -8 | -36 | -48 | -23 | -12 | -15 | -32 | -111 | -494 | -393 | -177 | -180 | -435 | -158 | -82 | -145 | -206 | -108 |
| | | 37 | 29 | 29 | 35 | 40 | 33 | 32 | 46 | 96 | 98 | 75 | 55 | 54 | 66 | 151 | 762 | 667 | 265 | 255 | 601 | 224 | 133 | 220 | 301 | 179 |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 112 | 143 | 162 | 224 | 257 | 169 | 328 | 150 | 130 | 113 | 132 | 231 | 155 | 113 | 152 | 132 | 143 | 156 | 98 | 79 | 63 | 72 | 99 | 125 | 147 |
| | -416 | -382 | -575 | -433 | -422 | -304 | -452 | -208 | -139 | -319 | -413 | -321 | -311 | -421 | -429 | -454 | -389 | -285 | -191 | -193 | -196 | -299 | -450 | -386 | -350 |
| | 529 | 527 | 739 | 659 | 680 | 474 | 781 | 358 | 270 | 433 | 546 | 553 | 467 | 535 | 582 | 588 | 533 | 442 | 290 | 274 | 260 | 373 | 550 | 513 | 498 |
| 17 | 104 | 122 | 82 | 85 | 105 | 56 | 25 | 21 | 19 | 30 | 56 | 108 | 78 | 99 | 132 | 111 | 85 | 22 | 14 | 45 | 50 | 41 | 44 | 31 | 65 |
| | -134 | -111 | -117 | -238 | -123 | -25 | -35 | -48 | -35 | -90 | -187 | -585 | -596 | -448 | -449 | -368 | -284 | -226 | -81 | -294 | -208 | -64 | -100 | -242 | -212 |
| | 239 | 235 | 200 | 324 | 229 | 82 | 61 | 69 | 55 | 121 | 243 | 694 | 675 | 548 | 583 | 480 | 370 | 249 | 96 | 340 | 259 | 106 | 146 | 274 | 278 |
| 18 | 33 | 54 | 52 | 61 | 48 | 45 | 32 | 29 | 62 | 75 | 60 | 24 | 25 | 39 | 14 | 9 | 17 | 4 | 5 | 8 | 11 | 12 | 4 | 13 | 31 |
| | -109 | -58 | -105 | -122 | -9 | -20 | -77 | -235 | -142 | -96 | -67 | -121 | -108 | -124 | -23 | -67 | -46 | -36 | -107 | -76 | -54 | -65 | -71 | -41 | -83 |
| | 143 | 113 | 159 | 184 | 58 | 66 | 110 | 265 | 204 | 171 | 128 | 146 | 133 | 164 | 37 | 77 | 65 | 41 | 113 | 84 | 66 | 79 | 76 | 56 | 114 |
| 19 | 22 | 20 | 20 | 22 | 30 | 32 | 27 | 19 | 21 | 21 | 22 | 82 | 78 | 58 | 28 | 20 | 50 | 31 | 34 | 51 | 20 | 21 | 26 | 17 | 32 |
| | -20 | -19 | -21 | -38 | -78 | -20 | -31 | -85 | -176 | -117 | -120 | -353 | -281 | -142 | -105 | -126 | -242 | -184 | -242 | -278 | -49 | -41 | -51 | -54 | -120 |
| | 43 | 40 | 42 | 61 | 109 | 53 | 58 | 105 | 199 | 138 | 143 | 437 | 360 | 201 | 134 | 147 | 293 | 216 | 276 | 329 | 70 | 64 | 78 | 72 | 153 |
| 20 | 15 | 24 | 25 | 19 | 18 | 25 | 21 | 23 | 21 | 22 | 27 | 16 | 13 | 10 | 59 | 25 | 3 | 17 | 22 | 12 | 19 | 11 | 12 | 18 | 20 |
| | -19 | -17 | -24 | -36 | -63 | -22 | -24 | -62 | -65 | -60 | -78 | -229 | -65 | -82 | -287 | -113 | -114 | -221 | -104 | -30 | -15 | -10 | -12 | -13 | -73 |
| | 36 | 42 | 50 | 56 | 82 | 48 | 46 | 86 | 86 | 82 | 106 | 247 | 79 | 93 | 347 | 139 | 118 | 239 | 128 | 43 | 35 | 22 | 25 | 33 | 94 |
| 21 | 18 | 23 | 17 | 23 | 42 | 41 | 41 | 30 | 56 | 68 | 58 | 76 | 114 | 145 | 106 | 194 | 244 | 191 | 198 | 237 | 136 | 158 | 127 | 39 | 99 |
| | -12 | -18 | -19 | -100 | -179 | -79 | -25 | -36 | -89 | -102 | -98 | -329 | -368 | -325 | -354 | -393 | -399 | -425 | -511 | -540 | -471 | -352 | -283 | -274 | -241 |
| | 32 | 42 | 37 | 124 | 221 | 121 | 66 | 67 | 146 | 170 | 157 | 407 | 483 | 471 | 461 | 587 | 644 | 616 | 710 | 777 | 609 | 512 | 411 | 315 | 341 |
| 22 | 69 | 180 | 162 | 142 | 93 | 86 | 99 | 83 | 92 | 104 | 77 | 50 | 104 | 109 | 83 | 26 | 29 | 83 | 123 | 98 | 120 | 88 | 85 | 67 | 94 |
| | -408 | -236 | -162 | -193 | -222 | -287 | -266 | -102 | -87 | -155 | -349 | -157 | -346 | -297 | -124 | -164 | -139 | -370 | -388 | -277 | -395 | -414 | -40 | -46 | -234 |
| | 477 | 418 | 325 | 336 | 316 | 374 | 365 | 186 | 180 | 260 | 426 | 208 | 452 | 408 | 209 | 191 | 169 | 454 | 512 | 376 | 516 | 503 | 127 | 114 | 329 |
| 23 | 102 | 68 | 52 | 108 | 92 | 58 | 52 | 84 | 74 | 67 | 77 | 96 | 101 | 89 | 48 | 45 | 44 | 77 | 30 | 14 | 19 | 21 | 26 | 25 | 61 |
| | -132 | -76 | -125 | -151 | -181 | -98 | -43 | -62 | -203 | -245 | -199 | -210 | -256 | -169 | -190 | -84 | -202 | -186 | -80 | -25 | -19 | -16 | -10 | -10 | -124 |
| | 235 | 146 | 179 | 260 | 274 | 156 | 96 | 146 | 278 | 313 | 277 | 306 | 357 | 259 | 239 | 129 | 248 | 264 | 112 | 40 | 39 | 38 | 37 | 37 | 186 |
| 24 | 20 | 32 | 27 | 18 | 20 | 28 | 25 | 58 | 51 | 53 | 63 | 78 | 95 | 60 | 31 | 21 | 7 | 9 | 13 | 18 | 11 | 13 | 31 | 25 | 34 |
| | -10 | -10 | -35 | -75 | -30 | -71 | -140 | -171 | -166 | -141 | -212 | -216 | -162 | -131 | -150 | -227 | -121 | -39 | -50 | -117 | -188 | -52 | -42 | -80 | -110 |
| | 32 | 43 | 63 | 94 | 51 | 100 | 166 | 230 | 217 | 195 | 276 | 295 | 258 | 192 | 182 | 250 | 129 | 49 | 64 | 136 | 200 | 66 | 74 | 106 | 145 |
| 25 | 27 | 25 | 36 | 30 | 19 | 36 | 41 | 50 | 48 | 36 | 40 | 33 | 48 | 47 | 80 | 21 | 11 | 1 | 4 | 17 | 20 | 30 | 41 | 39 | 32 |
| | -43 | -16 | -15 | -73 | -67 | -114 | -75 | -44 | -82 | -287 | -158 | -88 | -215 | -215 | -222 | -61 | -81 | -59 | -34 | -80 | -122 | -150 | -233 | -129 | -111 |
| | 71 | 42 | 51 | 104 | 86 | 150 | 117 | 94 | 130 | 324 | 199 | 121 | 264 | 263 | 304 | 83 | 93 | 61 | 39 | 98 | 144 | 180 | 276 | 170 | 144 |
| 26 | 43 | 26 | 47 | 53 | 41 | 24 | 11 | 13 | 12 | 42 | 47 | 28 | 16 | 9 | 14 | 12 | 7 | 6 | 8 | 7 | 11 | 15 | 17 | 17 | 22 |
| | -69 | -51 | -59 | -82 | 0 | -4 | -12 | -5 | -6 | -24 | -125 | -80 | -90 | -43 | -56 | -84 | -56 | -86 | -81 | -38 | -23 | -23 | -21 | -16 | -47 |
| | 113 | 79 | 107 | 137 | 42 | 29 | 24 | 19 | 19 | 67 | 172 | 109 | 107 | 53 | 71 | 97 | 64 | 93 | 90 | 46 | 36 | 39 | 39 | 34 | 70 |
| 27 | 20 | 21 | 20 | 22 | 21 | 16 | 24 | 31 | 31 | 30 | 30 | 22 | 22 | 18 | 12 | 7 | 11 | 10 | 7 | 9 | 11 | 12 | 14 | 15 | 18 |
| | -16 | -10 | -5 | -7 | -6 | -6 | -5 | -4 | -8 | -17 | -26 | -12 | -6 | -4 | -3 | -4 | -29 | -15 | -41 | -23 | -12 | -11 | -6 | -7 | -12 |
| | 37 | 32 | 27 | 30 | 29 | 23 | 30 | 36 | 40 | 48 | 56 | 35 | 30 | 23 | 16 | 13 | 41 | 25 | 49 | 33 | 24 | 24 | 22 | 23 | 31 |
| 28 | 14 | 14 | 15 | 16 | 19 | 23 | 29 | 26 | 33 | 19 | 32 | 35 | 21 | 26 | 20 | 11 | 12 | 8 | 15 | 45 | 60 | 51 | 69 | 75 | 29 |
| | -3 | -3 | -4 | -4 | -5 | -6 | -3 | -3 | -24 | -64 | -36 | -14 | -62 | -5 | -8 | -4 | -9 | -12 | -50 | -111 | -60 | -72 | -26 | -25 | -26 |
| | 18 | 19 | 21 | 22 | 26 | 31 | 33 | 30 | 58 | 83 | 68 | 49 | 83 | 32 | 29 | 16 | 23 | 21 | 66 | 156 | 121 | 123 | 96 | 101 | 55 |
| 29 | 85 | 81 | 81 | 68 | 52 | 35 | 44 | 38 | 42 | 53 | 24 | 19 | 25 | 18 | 18 | 14 | 13 | 11 | 11 | 13 | 16 | 17 | 19 | 17 | 34 |
| | -36 | -16 | -105 | -16 | -4 | 1 | -2 | -14 | -97 | -139 | -21 | -28 | -13 | -27 | -47 | -33 | -36 | -6 | -11 | -1 | -2 | -4 | -11 | -15 | -28 |
| | 123 | 98 | 187 | 85 | 57 | 33 | 47 | 52 | 140 | 192 | 46 | 48 | 39 | 46 | 66 | 49 | 51 | 18 | 23 | 15 | 19 | 22 | 31 | 34 | 63 |
| 30 | 16 | 15 | 16 | 19 | 20 | 13 | 12 | 13 | 10 | 32 | 20 | 23 | 22 | 15 | 17 | 19 | 13 | 8 | 6 | 8 | 9 | 9 | 10 | 13 | 15 |
| | -6 | -9 | -5 | -7 | -3 | -2 | -9 | -60 | -59 | -116 | -62 | -84 | -115 | -75 | -24 | -12 | -20 | -17 | -27 | -23 | -44 | -17 | -5 | -1 | -33 |
| | 24 | 25 | 22 | 27 | 24 | 16 | 22 | 74 | 70 | 148 | 83 | 108 | 138 | 91 | 42 | 32 | 34 | 25 | 34 | 33 | 54 | 28 | 17 | 15 | 49 |
| 31 | 15 | 15 | 16 | 23 | 38 | 35 | 43 | 49 | 45 | 40 | 43 | 75 | 114 | 70 | 79 | 44 | 28 | 44 | 34 | 28 | 54 | 87 | 53 | 29 | 46 |
| | -2 | -4 | -5 | -12 | -21 | -32 | -23 | -40 | -68 | -16 | -22 | -125 | -148 | -113 | -124 | -141 | -149 | -177 | -63 | -41 | -115 | -118 | -30 | -8 | -67 |
| | 18 | 19 | 22 | 36 | 60 | 68 | 66 | 90 | 114 | 57 | 66 | 201 | 263 | 185 | 204 | 186 | 179 | 222 | 98 | 71 | 169 | 205 | 84 | 39 | 113 |

# MONTHLY AND YEARLY **AE** 1957 - 1987

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Annual mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1957 | | | | | | 159. | 145. | 311. | 156. | 168. | 217. | 96.3 | 192.7 |
| 1958 | 193. | 255. | 302. | 263. | 231. | 273. | 270. | 201. | 186. | 175. | 132. | 183. | 221.9 |
| 1959 | 184. | 256. | 205. | 193. | 208. | 206. | 274. | 225. | 270. | 217. | 246. | 236. | 226.8 |
| 1960 | 171. | 162. | 183. | 317. | 207. | 235. | 225. | 211. | 212. | 324. | 277. | 255. | 231.6 |
| 1961 | 156. | 168. | 141. | 166. | 154. | 163. | 252. | 145. | 149. | 143. | 129. | 149. | 159.7 |
| 1962 | 90. | 95. | 100. | 160. | 110. | 131. | 140. | 172. | 198. | 221. | 152. | 155. | 143.6 |
| 1963 | 132. | 95. | 94. | 109. | 124. | 142. | 137. | 156. | 229. | 153. | 130. | 115. | 134.6 |
| 1964 | 116. | 122. | 133. | 149. | 124. | 95. | 99. | 88. | 137. | 142. | 97. | 71. | 114.4 |
| 1965 | 83. | 121. | 113. | 93. | 94. | 178. | 132. | 130. | 143. | 89. | 87. | 101. | 113.6 |
| 1966 | 108. | 130. | 152. | 145. | 162. | 146. | 180. | 176. | 223. | 152. | 148. | 157. | 156.4 |
| 1967 | 135. | 139. | 121. | 168. | 278. | 205. | 177. | 172. | 204. | 123. | 161. | 196. | 173.3 |
| 1968 | 187. | 227. | 256. | 231. | 268. | 302. | 213. | 203. | 206. | 184. | 198. | 163. | 219.9 |
| 1969 | 132. | 169. | 227. | 255. | 268. | 225. | 172. | 175. | 198. | 161. | 152. | 110. | 187.1 |
| 1970 | 118. | 104. | 210. | 233. | 199. | 243. | 276. | 222. | 203. | 194. | 192. | 135. | 194.1 |
| 1971 | 188. | 177. | 194. | 245. | 241. | 230. | 189. | 195. | 213. | 189. | 155. | 153. | 197.4 |
| 1972 | 192. | 156. | 203. | 203. | 193. | 238. | 177. | 259. | 196. | 202. | 180. | 133. | 194.3 |
| 1973 | 221. | 262. | 315. | 337. | 241. | 273. | 232. | 223. | 225. | 261. | 192. | 183. | 247.1 |
| 1974 | 201. | 226. | 324. | 309. | 297. | 278. | 322. | 307. | 306. | 326. | 248. | 245. | 282.3 |
| 1975 | 198. | 246. | 283. | 227. | 238. | 542. | 240. | 220. | 188. | 197. | 244. | 180. | 250.3 |
| 1976 | | | | | | | | | | | | | |
| 1977 | | | | | | | | | | | | | |
| 1978 | 188. | 237. | 244. | 292. | 310. | 308. | 214. | 239. | 246. | 192. | 214. | 177. | 238.4 |
| 1979 | 210. | 196. | 248. | 297. | 253. | 255. | 223. | 255. | 217. | 188. | 152. | 158. | 221.0 |
| 1980 | 136. | 164. | 122. | 182. | 184. | 262. | 203. | 180. | 165. | 195. | 199. | 151. | 178.6 |
| 1981 | 140. | 196. | 238. | 324. | 319. | 219. | 279. | 280. | 206. | 253. | 218. | 159. | 235.9 |
| 1982 | 174. | 387. | 221. | 305. | 290. | 367. | 372. | 319. | 347. | 275. | 255. | 277. | 299.1 |
| 1983 | 214. | 321. | 318. | 382. | 292. | 283. | 261. | 264. | 230. | 263. | 283. | 237. | 279.0 |
| 1984 | 197. | 253. | 300. | 330. | 315. | 284. | 279. | 261. | 311. | 302. | 246. | 255. | 277.8 |
| 1985 | 213. | 235. | 176. | 270. | 183. | 220. | 265. | 223. | 201. | 203. | 199. | 255. | 220.3 |
| 1986 | 176. | 273. | 208. | 139. | 203. | 188. | 172. | 232. | 217. | 161. | 188. | 138. | 191.3 |
| 1987 | 114. | 155. | 164. | 115. | 167. | 160. | 195. | 255. | 271. | 254. | 201. | 146. | 183.1 |

Unit : nT

## SECTION 4

# CLASSIFICATION OF DAYS

# CLASSIFICATION OF DAYS 1987

## JANUARY

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 4 5 6 14 30 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 3 4 5 6 7 10 11 14 18 25 26 30 |
| | K - quiet | : | 15 27 31 |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 4 5 6 7 10 13 14 25 26 30 31 |
| | K - quiet | : | 11 15 27 |

## FEBRUARY

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 2 3 4 5 14 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 2 3 4 5 13 14 15 18 19 25 26 |
| | K - quiet | : | 11 |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 1 2 3 4 5 14 15 |
| | K - quiet | : | 6 18 26 |

## MARCH

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 2 20 24 30 31 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 2 9 20 23 24 29 30 31 |
| | K - quiet | : | 25 |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 20 24 29 30 31 |
| | K - quiet | : | 2 23 25 |

## APRIL

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 3 18 21 23 28 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 2 3 6 12 15 16 17 18 21 22 23 25 26 28 29 30 |
| | K - quiet | : | NONE |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 2 11 16 17 21 22 25 28 29 30 |
| | K - quiet | : | 3 12 15 18 23 24 26 27 |

## MAY

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 12 17 18 19 21 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 23 30 31 |
| | K - quiet | : | 22 28 |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 30 31 |
| | K - quiet | : | 23 29 |

## JUNE

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 8 9 22 23 30 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 3 4 8 9 10 13 14 15 17 18 21 22 23 24 27 28 29 30 |
| | K - quiet | : | 2 25 |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 3 4 8 9 10 14 15 22 23 24 27 28 29 30 |
| | K - quiet | : | 2 17 21 |

**JULY**

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 1 2 6 7 26 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 1 2 5 6 7 13 14 21 23 26 27 |
| | K - quiet | : | NONE |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 1 2 5 6 13 22 23 |
| | K - quiet | : | 7 27 |

**AUGUST**

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 2 7 10 18 21 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 2 4 7 10 18 21 |
| | K - quiet | : | 11 |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 2 10 22 |
| | K - quiet | : | 7 11 21 |

**SEPTEMBER**

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 3 4 5 18 19 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 3 5 18 19 |
| | K - quiet | : | NONE |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 3 4 19 |
| | K - quiet | : | NONE |

**OCTOBER**

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 5 6 9 18 22 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 5 6 9 10 18 22 |
| | K - quiet | : | 7 |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 6 9 |
| | K - quiet | : | 5 19 |

**NOVEMBER**

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 8 17 18 29 30 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 8 16 17 18 21 29 30 |
| | K - quiet | : | 7 |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 8 17 21 29 30 |
| | K - quiet | : | 7 16 18 |

**DECEMBER**

| | | | |
|---|---|---|---|
| Five international quietest days (from Kp) | | : | 8 13 27 28 30 |
| 24-hours quiet intervals (from aa) | C - very quiet | : | 1 2 7 8 13 14 18 20 24 25 26 27 28 29 30 31 |
| | K - quiet | : | 9 |
| 48-hours quiet intervals (from aa) | C - very quiet | : | 1 7 8 13 14 19 20 24 25 26 27 28 29 30 31 |
| | K - quiet | : | 2 9 |

## QUIET DAYS 1987

| DAY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .. | .C | .. | .. | CC | .. | CC* | .. | .. | .. | .. | CC |
| 2 | .. | CC* | CK* | CC | CC | KK | CC* | CC* | .. | .. | .. | CK |
| 3 | C. | CC* | .. | CK* | CC | CC | .. | .. | CC* | .. | .. | .. |
| 4 | CC* | CC* | .. | .. | CC | CC | .. | C. | .C* | .. | .. | .. |
| 5 | CC* | CC* | .. | .. | CC | .. | CC | .. | C.* | CK* | .. | .. |
| 6 | CC* | .K | .. | C. | CC | .. | CC* | .. | .. | CC* | .. | .. |
| 7 | CC | .. | .. | .. | CC | .. | CK* | CK* | .. | K. | KK | CC |
| 8 | .. | .. | .. | .. | CC | CC* | .. | .. | .. | .. | CC* | CC* |
| 9 | .. | .. | C. | .. | CC | CC* | .. | .. | .. | CC* | .. | KK |
| 10 | CC | .. | .. | .. | CC | CC | .. | CC* | .. | C. | .. | .. |
| 11 | CK | K. | .. | .C | CC | .. | .. | KK | .. | .. | .. | .. |
| 12 | .. | .. | .. | CK | CC* | .. | .. | .. | .. | .. | .. | .. |
| 13 | .C | C. | .. | .. | CC | C. | CC | .. | .. | .. | .. | CC* |
| 14 | CC* | CC* | .. | .. | CC | CC | C. | .. | .. | .. | .. | CC |
| 15 | KK | CC | .. | CK | CC | CC | .. | .. | .. | .. | .. | .. |
| 16 | .. | .. | .. | CC | CC | .. | .. | .. | .. | .. | CK | .. |
| 17 | .. | .. | .. | CC | CC* | CK | .. | .. | .. | .. | CC* | .. |
| 18 | C. | CK | .. | CK* | CC* | C. | .. | C.* | C.* | C.* | CK* | C. |
| 19 | .. | C. | .. | .. | CC* | .. | .. | .. | CC* | .K | .. | .C |
| 20 | .. | .. | CC* | .. | CC | .. | .. | .. | .. | .. | .. | CC |
| 21 | .. | .. | .. | CC* | CC* | CK | C. | CK* | .. | .. | CC | .. |
| 22 | .. | .. | .. | CC | KC | CC* | .C | .C | .. | C.* | .. | .. |
| 23 | .. | .. | CK | CK* | CK | CC* | CC | .. | .. | .. | .. | .. |
| 24 | .. | .. | CC* | .K | .. | CC | .. | .. | .. | .. | .. | CC |
| 25 | CC | C. | KK | CC | .. | K. | .. | .. | .. | .. | .. | CC |
| 26 | CC | CK | .. | CK | .. | .. | C.* | .. | .. | .. | .. | CC |
| 27 | KK | .. | .. | .K | .. | CC | CK | .. | .. | .. | .. | CC* |
| 28 | .. | .. | .. | CC* | K. | CC | .. | .. | .. | .. | .. | CC* |
| 29 | .. | | CC | CC | .K | CC | .. | .. | .. | .. | CC* | CC |
| 30 | CC* | | CC* | CC | CC | CC* | .. | .. | .. | .. | CC* | CC* |
| 31 | KC | | CC* | | CC | | .. | .. | | .. | | CC |

C : indicates very quiet period;
K : indicates quiet period.
This characterization is deduced from aa values - see text p.13.
The first column is relative to the U.T. day,
the second column to the 48 hour interval centered on U.T. day.

An asterisk in the third column indicates that the U.T. day is one of the five quietest days of the month - according to Kp, see text p.22.

# CLASSIFICATION OF DAYS 1987 (continued)

## INTERNATIONAL QUIET AND DISTURBED DAYS 1987

| Month | Quietest Days 1-5 | | | | | Quietest Days 6-10 | | | | | Most Disturbed Days 1-5 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan | 5 | 4 | 6 | 30 | 14 | 7 | 15K | 11 | 10 | 13 | 20* | 1* | 16* | 28* | 23* |
| Feb | 3 | 2 | 5 | 4 | 14 | 19 | 13 | 26 | 15 | 11A | 20 | 21* | 12* | 22* | 8* |
| Mar | 20 | 2 | 31 | 30 | 24 | 29 | 23 | 3 | 25K | 13A | 27 | 5 | 7 | 21* | 22* |
| Apr | 3 | 28 | 23 | 18 | 21 | 30 | 16 | 25 | 26 | 2 | 4* | 7* | 5* | 13* | 8* |
| May | 18 | 19 | 12 | 21 | 17 | 8 | 20 | 15 | 16 | 9 | 25 | 29 | 24 | 27* | 31* |
| Jun | 30 | 23 | 8 | 9 | 22 | 10 | 28 | 15 | 3 | 29 | 6 | 19* | 12* | 26* | 7* |
| Jul | 1 | 26 | 2 | 7 | 6 | 13 | 27 | 14 | 23 | 5 | 29 | 28 | 15 | 16 | 25* |
| Aug | 10 | 7 | 2 | 21 | 18 | 22A | 4A | 11A | 6A | 9A | 26 | 25 | 31 | 27 | 13 |
| Sep | 19 | 3 | 5 | 4 | 18A | 6A | 9A | 8A | 21A | 7A | 25 | 30 | 11 | 1 | 10 |
| Oct | 9 | 6 | 18 | 22 | 5 | 19 | 10A | 20A | 12A | 7A | 28 | 27 | 3 | 14 | 11 |
| Nov | 17 | 29 | 30 | 8 | 18 | 7K | 21 | 22A | 1A | 16A | 23 | 3 | 13 | 24 | 2 |
| Dec | 27 | 8 | 30 | 28 | 13 | 14 | 2 | 31 | 26 | 7 | 16 | 10 | 22 | 5* | 17* |

These days are arranged according to their degree of quietness or disturbance, respectively.

## VERY QUIET INTERVALS, 1987

Kp not exceeding 1+ for at least 8 intervals
( = one day ) in succession

| First. . . . . last Eighth | | | | | Duration Eighths |
|---|---|---|---|---|---|
| Jan | 03 | E5 | 06 | E1 | 21 |
| | 10 | E6 | 11 | E6 | 9 |
| Feb | 03 | E4 | 04 | E5 | 10 |
| Mar | 20 | E1 | 21 | E2 | 10 |
| | 29 | E5 | 30 | E4 | 8 |
| Apr | 02 | E5 | 04 | E1 | 13 |
| | 15 | E8 | 16 | E8 | 9 |
| | 17 | E7 | 18 | E8 | 10 |
| | 25 | E1 | 26 | E4 | 12 |
| | 28 | E2 | 29 | E6 | 13 |
| | 29 | E8 | 30 | E7 | 8 |
| May | 04 | E4 | 05 | E3 | 8 |
| | 12 | E1 | 13 | E2 | 10 |
| | 16 | E8 | 19 | E8 | 25 |
| | 21 | E1 | 22 | E4 | 12 |

| First. . . . . last Eighth | | | | | Duration Eighths |
|---|---|---|---|---|---|
| Jun | 02 | E4 | 03 | E7 | 12 |
| | 08 | E1 | 09 | E7 | 15 |
| | 22 | E1 | 24 | E2 | 18 |
| | 30 | E1 | Jul 02 | E6 | 22 |
| Aug | 07 | E2 | 08 | E1 | 8 |
| | 09 | E8 | 10 | E8 | 9 |
| | 21 | E4 | 22 | E3 | 8 |
| Oct | 05 | E6 | 06 | E6 | 9 |
| Nov | 17 | E2 | 18 | E1 | 8 |
| | 29 | E2 | 30 | E6 | 13 |
| Dec | 07 | E2 | 09 | E6 | 21 |
| | 13 | E7 | 14 | E7 | 9 |
| | 26 | E5 | 28 | E6 | 18 |
| | 29 | E4 | 31 | E4 | 17 |

## LIST OF MAGNETIC STORMS, 1987

Gives consecutive sequences of three-hour-intervals (Eighths E of the Greenwich day) in which at least one Kp reached or surpassed 7+, and no Kp was smaller than 5-.

| Beginning | s.c. d. GMT | Duration Eighths | Number of Eighths with Kp= 7- 7o 7+ | 8- 8o 8+ | 9- 9o |
|---|---|---|---|---|---|
| — | — | — | — | — | — |

## SECTION 5

# RAPID VARIATIONS


| | | |
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# SECTION 5

## 5.1. List of ssc 1987

## STORM SUDDEN COMMENCEMENTS (ssc) 1987

Sudden commencements followed by a storm or period of storminess, as selected from the monthly reports of the 43 observatories listed below by their three letter code. The name of observatories together with their coordinates and operation dates are given in Section 2 (pages 29-36). The alternative codes used by observatories are given in brackets.

SOD CMO(COL) DOB NUR MNK WNG WIT IRT NGK VAL HAD DOU BDV CLF HRB UBA NAG GCK MMB AQU TFS EBR COI SPT FRD PEG(PEN) ALM KAK HTY KNY QUE SZT(TEN) LNP LUA PMG LMM(MPO) GNA LAS(ACS) CAN(CNB) AMS TRW(TWA) CZT KGL DUM.
Events are checked with the records of HON and EBR. Measurements of quality, duration and amplitude are from copies provided by the five low-latitude Observatories (MBO, FUQ, HON PMG, ABG) or their five supplementary Observatories (SZT(TEN), SJG, API, KNY, HYB(HYD)).

| JANUARY 1987 | None |
|---|---|

| FEBRUARY 1987 | None |
|---|---|

| MARCH 1987 | None |
|---|---|

| APRIL 1987 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 04/04 | 03:16 | 22222 | 5.1 | 35 | 21A | 12B | 1C | | | (12-20) |

| MAY 1987 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 13/05 | 14:04 | 12212 | 6.3 | 11 | 1A | 5B | 11C | 1si | 3sfe | (00-07) |

| JUNE 1987 | None |
|---|---|

| JULY 1987 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 03/07 | 19:16 | 22222 | 5.7 | 30 | 18A | 8B | | | | (13-19) |
| 24/07 | 16:36 | 23223 | 6.9 | 27 | 23A | 14B | | | | (30-38) |
| 28/07 | 08:50 | 22222 | 5.4 | 18 | 11A | 19B | 3C | | | (48-51) |

## STORM SUDDEN COMMENCEMENT (ssc) 1987 (continued)

| AUGUST 1987 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 22/08 | 09:39 | 22112 | 5.5 | 17 | 2A | 6B | 6C | 5si | 4sfe | (33-42) |
| 24/08 | 09:39 | 22222 | 5.1 | 27 | 14A | 15B | 4C | | | (33-41) |
| 25/08 | 06:58 | 00112 | 6.1 | 8 | 1A | – | 3C | | | (53-61) |
| 29/08 | 11:07 | 22112 | 6.9 | 15 | 1A | 8B | 4C | – | 3sfe | (06-10) |

| SEPTEMBER 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10/09 | 11:34 | 01122 | 3.0 | 13 | 5A | 16B | 5C | (30-38) |
| 20/09 | 15:24 | 01112 | 5.0 | 12 | 3A | 7B | 3C | (15-29) |
| 24/09 | 01:57 | 22222 | 5.7 | 26 | 14A | 16B | | (53-62) |

| OCTOBER 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 03/10 | 04:33 | 01111 | 5.9 | 8 | – | 6B | 7C | (32-35) |

| NOVEMBER 1987 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 03/11 | 10:00 | 22222 | 6.4 | 16 | 1A | 6B | 11C | | (59-62) |
| 07/11 | 03:26 | 11121 | 7.5 | 23 | 2A | 3B | 5C | 2si | (24-30) |

| DECEMBER 1987 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 09/12 | 19:41 | 12222 | 5.8 | 19 | 5A | 16B | 5C | 1si | (38-46) |

# SECTION 5

## 5.2. List of sfe 1982


- Solar-flare effects 1982
  - Summary list 143
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- Doubtful solar-flare effects 1982
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# SOLAR-FLARE EFFECTS - Summary List 1982

| JANUARY 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01/01 | 00:54 | C | 2 A | 2 B | 13 C | 6 D | 1 E | 6X |
| 02/01 | 06:09 | C | 5 A | 6 B | 26 C | 6 D | 0 E | 2X |
| 13/01 | 01:26 | C | 3 A | 3 B | 10 C | 9 D | 2 E | 2X |

| FEBRUARY 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01/02 | 00:31 | C | 2 A | 7 B | 23 C | 4 D | 1 E | 4X |
| 05/02 | 09:06 | C | 2 A | 16 B | 23 C | 4 D | 16 E | 1X |
| 08/02 | 02:40 | C | 2 A | 7 B | 19 C | 7 D | 1 E | 1X |
| 28/02 | 04:50 | C | 2 A | 8 B | 18 C | 11 D | 1 E | 3X |

| MARCH 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 07/03 | 03:03 | C | 17 A | 2 B | 5 C | 6 D | 1 E | 2X |
| 17/03 | 02:39 | C | 2 A | 4 B | 12 C | 15 D | 3 E | 2X |
| 30/03 | 02:37 | C | 0 A | 4 B | 27 C | 9 D | 1 E | 1X |
| 30/03 | 05:31 | C | 15 A | 20 B | 9 C | 8 D | 3 E | 1X |

| APRIL 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 02/04 | 09:07 | C | 7 A | 9 B | 22 C | 9 D | 5 E | 2X |
| 14/04 | 01:01 | C | 0 A | 3 B | 15 C | 13 D | 1 E | 0X |
| 14/04 | 06:03 | C | 10 A | 13 B | 19 C | 15 D | 1 E | 0X |
| 29/04 | 11:10 | C | 8 A | 25 B | 15 C | 2 D | 13 E | 0X |

| MAY 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 26/05 | 07:02 | C | 0 A | 2 B | 25 C | 24 D | 4 E | 3X |

## SOLAR-FLARE EFFECTS - Summary List 1982 (continued)

| JUNE 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 03/06 | 11:42 | C | 40 A | 6 B | 11 C | 1 D | 0 E | 2X |
| 04/06 | 05:06 | C | 2 A | 8 B | 23 C | 21 D | 2 E | 2X |
| 04/06 | 06:31 | C | 2 A | 3 B | 27 C | 21 D | 2 E | 2X |
| 04/06 | 13:26 | C | 35 A | 9 B | 7 C | 1 D | 0 E | 1X |
| 05/06 | 01:27 | C | 4 A | 6 B | 19 C | 10 D | 1 E | 2X |
| 05/06 | 06:15 | C | 9 A | 9 B | 24 C | 14 D | 2 E | 2X |
| 05/06 | 07:27 | C | 12 A | 15 B | 28 C | 5 D | 1 E | 1X |
| 06/06 | 16:31 | C | 21 A | 21 B | 13 C | 0 D | 3 E | 1X |
| 10/06 | 00:58 | C | 11 A | 11 B | 29 C | 1 D | 8 E | 0X |
| 10/06 | 11:45 | C | 20 A | 10 B | 13 C | 2 D | 21 E | 0X |
| 12/06 | 05:15 | C | 9 A | 8 B | 23 C | 10 D | 12 E | 0X |
| 15/06 | 10:20 | C | 12 A | 10 B | 23 C | 5 D | 8 E | 1X |
| 15/06 | 14:10 | C | 5 A | 13 B | 14 C | 12 D | 11 E | 1X |
| 15/06 | 15:11 | C | 3 A | 16 B | 17 C | 7 D | 8 E | 1X |
| 16/06 | 02:10 | C | 1 A | 11 B | 25 C | 12 D | 4 E | 3X |
| 17/06 | 02:41 | C | 0 A | 5 B | 26 C | 19 D | 1 E | 1X |
| 20/06 | 01:49 | C | 13 A | 17 B | 21 C | 7 D | 6 E | 1X |
| 20/06 | 04:02 | C | 4 A | 8 B | 23 C | 18 D | 5 E | 2X |
| 21/06 | 23:01 | C | 9 A | 11 B | 19 C | 3 D | 2 E | 1X |
| 23/06 | 23:30 | C | 4 A | 10 B | 22 C | 7 D | 4 E | 1X |
| 25/06 | 21:32 | C | 2 A | 5 B | 25 C | 5 D | 1 E | 3X |
| 26/06 | 00:45 | C | 10 A | 9 B | 15 C | 5 D | 0 E | 3X |
| 26/06 | 09:40 | C | 4 A | 5 B | 29 C | 18 D | 0 E | 1X |

| JULY 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 04/07 | 04:39 | C | 1 A | 5 B | 24 C | 27 D | 0 E | 5X |
| 09/07 | 07:32 | C | 20 A | 20 B | 13 C | 3 D | 4 E | 3X |
| 09/07 | 21:06 | C | 7 A | 6 B | 25 C | 3 D | 1 E | 3X |
| 10/07 | 03:16 | C | 0 A | 5 B | 11 C | 32 D | 2 E | 4X |
| 10/07 | 04:08 | C | 2 A | 7 B | 16 C | 25 D | 1 E | 3X |
| 10/07 | 23:20 | C | 0 A | 10 B | 19 C | 7 D | 1 E | 3X |
| 19/07 | 03:51 | C | 1 A | 2 B | 21 C | 28 D | 3 E | 4X |
| 19/07 | 04:21 | C | 2 A | 2 B | 30 C | 18 D | 3 E | 4X |
| 19/07 | 05:43 | C | 2 A | 10 B | 16 C | 23 D | 4 E | 4X |
| 20/07 | 12:52 | C | 5 A | 15 B | 24 C | 4 D | 2 E | 4X |
| 22/07 | 05:10 | C | 2 A | 7 B | 27 C | 18 D | 4 E | 5X |

## SOLAR-FLARE EFFECTS - Summary List 1982 (continued)

| AUGUST 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 08/08 | 02:04 | C | 9 A | 11 B | 17 C | 3 D | 0 E | 5 X |
| 14/08 | 02:40 | C | 0 A | 7 B | 30 C | 13 D | 1 E | 4 X |
| 14/08 | 04:00 | C | 1 A | 2 B | 26 C | 19 D | 1 E | 6 X |
| 14/08 | 05:06 | C | 5 A | 11 B | 23 C | 12 D | 0 E | 4 X |
| 27/08 | 03:24 | C | 1 A | 9 B | 34 C | 7 D | 6 E | 4 X |
| 27/08 | 05:42 | C | 2 A | 5 B | 33 C | 11 D | 5 E | 4 X |

| SEPTEMBER 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01/09 | 07:37 | C | 4 A | 11 B | 31 C | 8 D | 1 E | 7 X |
| 30/09 | 01:35 | C | 3 A | 3 B | 16 C | 10 D | 0 E | 3 X |

| OCTOBER 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 27/10 | 04:04 | C | 1 A | 6 B | 31 C | 6 D | 2 E | 5 X |

| NOVEMBER 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 15/11 | 01:58 | C | 5 A | 5 B | 29 C | 4 D | 1 E | 1 X |
| 16/11 | 03:34 | C | 2 A | 7 B | 26 C | 6 D | 3 E | 1 X |
| 20/11 | 05:29 | C | 0 A | 2 B | 10 C | 19 D | 1 E | 4 X |

| DECEMBER 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 15/12 | 01:58 | C | 19 A | 6 B | 18 C | 0 D | 7 E | 1 X |
| 22/12 | 08:25 | C | 4 A | 4 B | 28 C | 8 D | 7 E | 3 X |
| 29/12 | 06:44 | C | 14 A | 15 B | 21 C | 1 D | 5 E | 3 X |

# SOLAR-FLARE EFFECTS (sfe) 1982

Times of commencements of solar-flare effects (sfe). The letter C indicates that the sfe is confirmed. The list of the observatories reporting a movement (A, B, C), or not (D, E, X, see text) are given for each event; normal brackets indicate stations in the twilight zone, square brackets stations in the nightside of earth.
The list of the collaborating 68 observatories is given below. They are identified by their IAGA three letter code, with alternative codes given in brackets (see list in Section 2, pages 29-36).

NOK KIR SOD DOB YAK POD NUR LER MGD LNN UPP SVD KZN(KNS) ESK MNK WNG PET WIT NGK VAL GTT HAD KIV LVV KGD NEW THY(TYH) HRB UBA YSS ODE NKK GCK MMB AAA AQU TFS TKT EBR COI TOL(SPT) FRD PEG(PEN) ASH KAK HTY TUC KNY SZT(TEN) LNP HON ABG SJG HYB MUT GUA ETT BNG PMG HUA API PPT LMM(MPO) GNA LAS(ACS) CAN(CNB) TRN(TWA) EYR

| | JANUARY 1982 | | | | | | | | 01/01 00:54 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET3 | (ABG0) | | | | | | | |
| B | API2 | PPT1 | | | | | | | |
| C | (NOK0)<br>LNP3 | (POD0)<br>(ETT0) | MGD0<br>PMG1 | UBA2<br>[MPO2] | YSS1 | MMB2 | KAK2 | HTY0 | KNY2 |
| D | HON | MUT | GUA | GNA | CNB | EYR | | | |
| E | [TYH ] | | | | | | | | |
| X | [UPP ] | [ESK ] | [LVV ] | [ODE ] | (AAA ) | [BNG ] | | | |

| | JANUARY 1982 | | | | | | | | 02/01 06:09 C |
|---|---|---|---|---|---|---|---|---|---|
| A | TKT3 | ABG2 | HYB3 | ETT1 | MPO3 | | | | |
| B | (TYH1) | AAA2 | KAK3 | KNY3 | MUT1 | GNA0 | | | |
| C | POD2<br>(GTT0)<br>(EBR0) | (MGD0)<br>KGD0<br>ASH1 | SVD2<br>(HRB0)<br>HTY3 | KNS2<br>UBA3<br>[TEN2] | [ESK]<br>YSS0<br>LNP3 | (MNK1)<br>NKK1<br>GUA1 | (PET1)<br>MMB3<br>BNG1 | (NGK1)<br>(AQU1)<br>[PPT1] | [VAL0]<br>TFS1 |
| D | KIV | ODE | PEN | PMG | CNB | EYR | | | |
| E | | | | | | | | | |
| X | (NOK ) | (UPP ) | | | | | | | |

| | JANUARY 1982 | | | | | | | | 13/01 01:26 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET3 | UBA0 | MUT1 | | | | | | |
| B | LNP3 | PMG1 | API2 | | | | | | |
| C | (NOK1)<br>GUA0 | [VAL0] | [TYH1] | YSS2 | MMB2 | (AAA1) | KAK1 | HTY1 | KNY1 |
| D | YAK | MGD | HON | HYB | ETT | PPT | GNA | CNB | EYR |
| E | [ODE ] | [BNG ] | | | | | | | |
| X | (TKT ) | [ASH ] | | | | | | | |

| | FEBRUARY 1982 | | | | | | | | 01/02 00:31 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD3 | UBA0 | | | | | | | |
| B | PET1 | MMB3 | LNP3 | PMG1 | API1 | PPT1 | EYR1 | | |
| C | (NOK0) | [SVD1] | [NGK1] | [GTT0] | [HAD1] | [KIV1] | [TYH1] | [HRB1] | YSS1 |
| | [ODE2] | [GCK0] | (AAA1) | [AQU0] | [TFS1] | [TKT2] | [SPT0] | KAK3 | HTY1 |
| | TUC1 | KNY3 | MUT1 | GUA0 | [MPO3] | | | | |
| D | YAK | HON | GNA | CNB | | | | | |
| E | [BNG ] | | | | | | | | |
| X | [KIR ] | (POD ) | [MNK ] | [LVV ] | | | | | |

| | FEBRUARY 1982 | | | | | | | | 05/02 09:06 C |
|---|---|---|---|---|---|---|---|---|---|
| A | (YAK1) | ABG0 | | | | | | | |
| B | (NOK0) | SOD1 | NUR2 | WNG3 | [PET1] | NGK1 | HAD | KGD0 | HRB1 |
| | ODE2 | NKK1 | AQU1 | (GUA0) | ETT0 | (PMG1) | MPO1 | | |
| C | POD2 | WIT2 | VAL1 | GTT0 | KIV1 | LVV2 | [NEW0] | TYH1 | (YSS0) |
| | [MMB0] | AAA2 | TFS1 | TKT2 | EBR2 | SPT0 | (KAK0) | [TUC0] | (KNY0) |
| | LNP3 | [HON1] | MUT0 | ACS1 | (TWA1) | | | | |
| D | UPP | COI | TEN | GNA | | | | | |
| E | KIR | DOB | LER | [MGD ] | LNN | SVD | KNS | MNK | UBA |
| | GCK | PEN | ASH | (HTY ) | HYB | BNG | [PPT ] | | |
| X | ESK | | | | | | | | |

| | FEBRUARY 1982 | | | | | | | | 08/02 02:40 C |
|---|---|---|---|---|---|---|---|---|---|
| A | UBA0 | PMG3 | | | | | | | |
| B | (NOK0) | [WNG0] | KGD0 | LNP3 | MUT0 | GUA3 | PPT1 | | |
| C | [SOD0] | POD1 | MGD0 | [ESK-] | PET0 | [WIT1] | [NGK0] | [NEW0] | [HRB0] |
| | YSS1 | MMB1 | AAA0 | KAK1 | KNY1 | HON1 | ETT0 | (MPO0) | GNA2 |
| | EYR1 | | | | | | | | |
| D | YAK | TKT | HTY | ABG | HYB | API | CNB | | |
| E | [BNG ] | | | | | | | | |
| X | [LVV ] | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | FEBRUARY 1982 | | | | | | | | 28/02 04:50 C |
|---|---|---|---|---|---|---|---|---|---|
| A | TKT0 | PMG3 | | | | | | | |
| B | MMB3 | KAK3 | [TUC0] | KNY3 | LNP3 | HYB3 | GUA2 | ETT2 | |
| C | POD1 | SVD2 | PET2 | (NGK0) | KGD0 | (HRB0) | UBA2 | YSS2 | ODE2 |
| | AAA2 | (AQU0) | [FRD0] | HTY2 | (PPT1) | MPO1 | GNA0 | [ACS0] | [TWA0] |
| D | NOK | YAK | MGD | KNS | KIV | NKK | TFS | ASH | API |
| | CNB | EYR | | | | | | | |
| E | BNG | | | | | | | | |
| X | (TYH) | ABG | MUT | | | | | | |

| | MARCH 1982 | | | | | | | | 07/03 03:03 C |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK3 | MGD3 | PET3 | YSS3 | MMB3 | KAK3 | HTY3 | KNY3 | LNP3 |
| | ABG2 | HYB3 | MUT2 | GUA3 | ETT3 | PMG1 | PPT1 | EYR3 | |
| B | API2 | GNA2 | | | | | | | |
| C | POD1 | UBA3 | AAA2 | [TUC1] | CNB1 | | | | |
| D | NOK | SVD | KGD | NKK | TKT | HON | | | |
| E | [BNG] | | | | | | | | |
| X | [COI] | ASH | | | | | | | |

| | MARCH 1982 | | | | | | | | 17/03 02:39 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD3 | TKT3 | | | | | | | |
| B | (UPP1) | PET2 | LNP3 | MUT2 | | | | | |
| C | POD0 | UBA2 | YSS2 | MMB3 | [SPT0] | KAK3 | HTY2 | KNY3 | GUA2 |
| | PMG1 | (MPO2) | GNA3 | | | | | | |
| D | NOK | YAK | SVD | KGD | NKK | AAA | ASH | HON | ABG |
| | HYB | ETT1 | API | PPT | CNB | EYR | | | |
| E | [DOB] | [TYH] | [BNG] | | | | | | |
| X | [COI] | [PEN] | | | | | | | |

| | MARCH 1982 | | | | | | | 30/03 02:37 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MGD0 | [NGK1] | MUT1 | GUA3 | | | | | |
| C | NOK0 | (SOD0) | POD0 | (NUR0) | SVD2 | PET2 | [WIT0] | [VAL0] | [HRB0] |
| | UBA2 | YSS1 | NKK1 | MMB3 | AAA1 | TKT3 | [EBR0] | [FRD1] | KAK3 |
| | HTY2 | KNY3 | LNP3 | ABG0 | ETT0 | PMG1 | (MPO1) | GNA0 | EYR1 |
| D | YAK | KNS | KGD | ASH | HON | HYB | API | PPT | CNB |
| E | [BNG ] | | | | | | | | |
| X | [SJG ] | | | | | | | | |

| | MARCH 1982 | | | | | | | 30/03 05:31 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK3 | POD2 | MGD2 | SVD2 | PET3 | UBA2 | NKK2 | MMB3 | AAA3 |
| | TKT2 | ASH3 | KAK3 | KNY3 | ABG2 | HYB3 | | | |
| B | NOK0 | SOD1 | (LER1) | LNN1 | MNK1 | WNG1 | WIT1 | KIV2 | KGD0 |
| | YSS2 | ODE2 | TFS1 | (COI0) | HTY3 | LNP3 | MUT1 | ETT1 | BNG1 |
| | MPO2 | GNA2 | | | | | | | |
| C | NUR0 | NGK1 | (VAL0) | GTT1 | HRB1 | AQU1 | PEN1 | [ACS0] | [TWA0] |
| D | KIR | DOB | UPP | LVV | GUA | PMG | CNB | EYR | |
| E | KNS | TYH | GCK | | | | | | |
| X | [SJG ] | | | | | | | | |

| | APRIL 1982 | | | | | | | 02/04 09:07 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD3 | KNS3 | KIV2 | NKK2 | TKT3 | ABG1 | MPO1 | | |
| B | NOK0 | (PET0) | LVV2 | KGD1 | HRB3 | GCK3 | ASH2 | LNP3 | HYB2 |
| C | YAK1 | MNK2 | WNG0 | WIT2 | NGK0 | VAL0 | GTT0 | [NEW0] | (YSS0) |
| | ODE2 | (MMB1) | AAA2 | AQU1 | EBR3 | SPT1 | PEN2 | (KAK1) | KNY1 |
| | TEN2 | MUT0 | ETT0 | GNA0 | | | | | |
| D | KIR | SOD | DOB | NUR | LER | UPP | HAD | TFS | COI |
| E | POD | (MGD) | LNN | TYH | BNG | | | | |
| X | ESK | UBA | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | APRIL 1982 | | | | | | | | 14/04 01:01 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MGD1 | LNP3 | GUA1 | | | | | | |
| C | PET1<br>HON2 | UBA2<br>PMG2 | YSS1<br>API2 | [ODE2]<br>PPT1 | MMB3<br>GNA1 | TKT2<br>EYR0 | KAK3 | HTY2 | KNY3 |
| D | NOK<br>HYB | YAK<br>MUT | POD<br>ETT | SVD<br>CNB | KGD | NEW | AAA | TUC | ABG |
| E | [BNG ] | | | | | | | | |
| X | | | | | | | | | |

| | APRIL 1982 | | | | | | | | 14/04 06:03 C |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK2<br>ETT3 | POD2 | SVD3 | PET2 | AAA3 | TKT3 | ASH3 | LNP3 | ABG2 |
| B | SOD2<br>HYB3 | MGD0<br>MUT1 | KNS1<br>GUA3 | HAD1<br>GNA2 | KGD1 | ODE2 | MMB3 | KAK3 | KNY3 |
| C | KIR-<br>AQU2<br>CNB2 | ESK-<br>TFS2 | MNK1<br>EBR0 | NGK1<br>SPT0 | GTT1<br>PEN1 | KIV1<br>HTY3 | HRB1<br>[TUC0] | UBA3<br>[SJG0] | YSS2<br>PMG1 |
| D | NOK<br>LVV | DOB<br>NKK | NUR<br>GCK | LER<br>COI | LNN<br>BNG | UPP<br>MPO | WNG | WIT | VAL |
| E | TYH | | | | | | | | |
| X | | | | | | | | | |

| | APRIL 1982 | | | | | | | | 29/04 11:10 C |
|---|---|---|---|---|---|---|---|---|---|
| A | NUR3 | LNN1 | KGD2 | (NEW0) | NKK2 | TKT3 | ABG2 | (HUA0) | |
| B | NOK0<br>NGK1<br>PEN1 | KIR-<br>VAL2<br>ASH2 | LER2<br>GTT2<br>[KAK0] | UPP1<br>ODE2<br>[TUC0] | ESK1<br>(MMB0)<br>(KNY0) | MNK1<br>AQU1<br>TEN2 | WNG3<br>TFS2<br>(MUT2) | (PET1)<br>EBR2 | WIT2<br>COI0 |
| C | KNS2<br>[GUA0] | KIV1<br>ETT0 | LVV2<br>[PMG0] | UBA2<br>ACS1 | (YSS1)<br>[CNB1] | SPT1<br>(TWA1) | (LNP0) | [HON0] | SJG0 |
| D | YAK | HAD | | | | | | | |
| E | SOD<br>FRD | DOB<br>HYB | POD<br>BNG | (MGD)<br>MPO | SVD | TYH | HRB | GCK | AAA2 |
| X | | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | MAY 1982 | | | | | | | 26/05 07:02 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | POD1 | LNP3 | | | | | | | |
| C | NOK0 | SVD1 | PET0 | WIT0 | NGK0 | VAL0 | HAD- | LVV2 | HRB0 |
| | YSS1 | ODE2 | MMB1 | AAA2 | AQU1 | TFS1 | TKT2 | SPT1 | ASH1 |
| | KAK1 | KNY2 | [HON0] | ABG0 | ETT0 | MPO2 | (CNB0) | | |
| D | KIR | SOD | DOB | YAK | NUR | LER | LNN | UPP | KNS |
| | ESK | MNK | WNG | GTT | KIV | TYH | NKK | GCK | COI |
| | PEN | HTY | TEN | GUA | PMG | GNA | | | |
| E | MGD | EBR | HYB | BNG | | | | | |
| X | KGD | UBA | MUT | | | | | | |

| | JUNE 1982 | | | | | | | 03/06 11:42 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | SOD2 | YAK2 | POD1 | NUR3 | LNN2 | SVD3 | KNS2 | ESK0 | MNK2 |
| | WNG3 | WIT3 | NGK2 | VAL1 | GTT3 | HAD0 | KIV2 | LVV3 | KGD3 |
| | HRB3 | UBA3 | ODE2 | NKK3 | GCK2 | AAA2 | AQU1 | TFS3 | TKT3 |
| | EBR3 | COI1 | SPT3 | FRD2 | PEN1 | ASH3 | TEN3 | ABG2 | SJG3 |
| | BNG1 | HUA3 | MPO3 | (TWA2) | | | | | |
| B | NOK3 | KIR- | LER2 | (PET1) | TYH3 | HYB3 | | | |
| C | DOB1 | (MGD0) | (NEW0) | (MMB1) | [KAK1] | (TUC0) | (KNY1) | (LNP3) | [HON0] |
| | [GUA0] | ETT0 | | | | | | | |
| D | UPP | | | | | | | | |
| E | | | | | | | | | |
| X | (MUT) | ACS | | | | | | | |

| | JUNE 1982 | | | | | | | 04/06 05:06 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | PET2 | ABG0 | | | | | | | |
| B | YAK1 | UBA2 | MMB3 | KAK3 | HTY3 | KNY3 | HYB2 | ETT0 | |
| C | NOK0 | POD2 | LER- | MGD0 | SVD1 | NGK0 | HAD- | LVV2 | KGD0 |
| | (NEW0) | HRB0 | YSS1 | ODE2 | AAA2 | AQU0 | TKT2 | ASH2 | [TUC0] |
| | LNP3 | GUA0 | PMG1 | MPO2 | CNB1 | | | | |
| D | KIR | DOB | NUR | LNN | UPP | KNS | ESK | MNK | WNG |
| | WIT | VAL | GTT | KIV | NKK | TFS | EBR | SPT | PEN |
| | HON | BNG | GNA | | | | | | |
| E | TYH | GCK | | | | | | | |
| X | SOD | MUT | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JUNE 1982 | | | | | | | 04/06 06:31 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | TKT2 | ASH2 | | | | | | | |
| B | ABG2 | HYB2 | ETT2 | | | | | | |
| C | NOK0 | YAK2 | POD2 | LER- | MGD0 | SVD1 | KNS2 | PET0 | WIT1 |
| | NGK0 | VAL0 | KGD0 | HRB0 | YSS1 | ODE2 | GCK0 | MMB3 | AAA0 |
| | TFS2 | EBR0 | KAK3 | HTY2 | KNY3 | LNP3 | GUA1 | PMG0 | MPO2 |
| D | KIR | SOD | DOB | NUR | LNN | UPP | ESK | MNK | WNG |
| | GTT | HAD | KIV | LVV | NKK | AQU | COI | SPT | PEN |
| | TEN | GNA | CNB | | | | | | |
| E | TYH | BNG | | | | | | | |
| X | UBA | MUT | | | | | | | |

| | JUNE 1982 | | | | | | | 04/06 13:26 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | SOD3 | DOB2 | POD2 | NUR1 | LNN3 | UPP1 | SVD3 | KNS1 | MNK3 |
| | WNG3 | WIT3 | NGK1 | HAD2 | KIV2 | LVV2 | TYH1 | HRB3 | ODE2 |
| | NKK2 | GCK3 | AQU3 | TFS3 | EBR3 | COI2 | SPT2 | PEN3 | ASH2 |
| | TUC2 | TEN3 | SJG3 | BNG1 | HUA3 | MPO3 | ACS2 | TWA2 | |
| B | (YAK1) | LER1 | ESK1 | (PET1) | GTT2 | KGD1 | (UBA2) | AAA0 | ABG2 |
| C | NOK3 | KIR- | VAL0 | TKT0 | FRD1 | (HYB1) | (ETT0) | | |
| D | NEW | | | | | | | | |
| E | | | | | | | | | |
| X | [MUT] | | | | | | | | |

| | JUNE 1982 | | | | | | | 05/06 01:27 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | UBA3 | AAA3 | TKT3 | PPT1 | | | | | |
| B | MMB3 | KAK3 | TUC2 | KNY3 | GUA2 | ETT0 | | | |
| C | NOK0 | KIR- | SOD1 | YAK1 | POD1 | SVD1 | KNS0 | PET2 | KGD0 |
| | (HRB0) | YSS1 | (ODE2) | ASH1 | HTY3 | LNP3 | HON1 | PMG0 | [MPO1] |
| | [ACS0] | | | | | | | | |
| D | NUR | MGD | LNN | NEW | ABG | HYB | API | GNA | CNB |
| | EYR | | | | | | | | |
| E | [BNG] | | | | | | | | |
| X | NKK | MUT | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JUNE 1982 | | | | | | 05/06 06:15 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK2 | POD2 | SVD3 | PET2 | UBA2 | ASH3 | ABG2 | HYB3 | ETT3 |
| B | TYH1 | HRB3 | MMB3 | TFS2 | PEN2 | KAK3 | HTY3 | KNY3 | LNP3 |
| C | NOK2<br>YSS2<br>PMG0 | SOD1<br>ODE2<br>MPO1 | MGD0<br>GCK0<br>GNA2 | KNS2<br>AAA3<br>[ACS0] | WIT0<br>AQU1<br>CNB1 | NGK0<br>TKT0<br>[TWA0] | VAL0<br>EBR1 | KIV1<br>[TUC0] | KGD0<br>GUA0 |
| D | KIR<br>LVV | DOB<br>NKK | NUR<br>COI | LER<br>SPT | LNN<br>TEN | UPP | WNG | GTT | HAD |
| E | ESK | BNG | | | | | | | |
| X | MNK | MUT | | | | | | | |

| | JUNE 1982 | | | | | | 05/06 07:27 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK2<br>HYB3 | POD3<br>ETT3 | MGD0<br>MPO3 | SVD2 | HRB3 | UBA3 | COI2 | ASH3 | ABG0 |
| B | KNS1<br>MMB3 | MNK2<br>PEN2 | WNG3<br>KAK3 | PET1<br>KNY3 | HAD<br>LNP3 | LVV2<br>GNA1 | KGD2 | TYH1 | ODE2 |
| C | NOK3<br>GTT2<br>SPT2<br>[HUA0] | SOD1<br>KIV1<br>[FRD0] | NUR1<br>[NEW0]<br>HTY3 | LER-<br>YSS2<br>[TUC0] | LNN2<br>GCK0<br>TEN2 | ESK2<br>AAA2<br>[HON0] | WIT1<br>AQU2<br>[SJG0] | NGK2<br>TFS2<br>GUA2 | VAL1<br>TKT2<br>PMG0 |
| D | KIR | DOB | UPP | NKK | BNG | | | | |
| E | EBR | | | | | | | | |
| X | MUT | | | | | | | | |

| | JUNE 1982 | | | | | | 06/06 16:31 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | KIR-<br>NEW1<br>PPT1 | DOB2<br>HRB3<br>ACS2 | LNN2<br>EBR3<br>TWA2 | SVD1<br>COI2 | WNG3<br>FRD1 | (PET2)<br>TUC2 | WIT3<br>TEN2 | NGK2<br>SJG2 | HAD2<br>HUA3 |
| B | SOD3<br>LVV2<br>[KAK0] | (POD1)<br>(KGD1)<br>[KNY0] | LER3<br>TYH3<br>HON2 | UPP1<br>[UBA2] | KNS2<br>ODE2 | ESK2<br>(MMB0) | MNK2<br>AQU2 | VAL1<br>SPT2 | KIV2<br>(ASH2) |
| C | NOK3<br>[GUA0] | NUR1<br>[ETT0] | GTT1<br>[PMG0] | (YSS1)<br>[MPO1] | GCK3 | (AAA0) | (TFS2) | (TKT2) | PEN1 |
| D | | | | | | | | | |
| E | (YAK) | (MGD) | BNG | | | | | | |
| X | [MUT] | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JUNE 1982 | | | | | | 10/06 00:58 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | LNN1 LNP3 | SVD2 ABG0 | PET0 | KGD2 | UBA3 | NKK2 | AAA3 | TKT3 | ASH3 |
| B | YAK2 PPT1 | KNS2 [MPO1] | (MNK0) | (WNG0) | (NGK0) | (KIV1) | (ODE2) | TUC2 | GUA2 |
| C | NOK1 MMB1 HON1 [TWA0] | KIR- [AQU0] [SJG0] EYR0 | POD2 (TFS1) ETT0 | (UPP1) [SPT0] [BNG1] | (WIT1) (FRD0) PMG2 | (VAL0) KAK1 API0 | (HAD-) HTY1 GNA1 | NEW0 KNY1 [ACS0] | YSS1 [TEN2] CNB1 |
| D | SOD | | | | | | | | |
| E | MGD | (TYH) | (HRB) | (GCK) | [EBR] | [PEN] | HYB | MUT | |
| X | | | | | | | | | |

| | JUNE 1982 | | | | | | 10/06 11:45 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | NOK2 UBA3 [MUT2] | YAK2 (YSS3) HUA3 | LER1 ODE2 | WNG3 NKK2 | (PET2) AQU1 | NGK1 TFS2 | GTT3 TKT3 | KIV2 EBR1 | KGD2 COI2 |
| B | KIR- [EYR1] | ESK0 | WIT1 | (MMB0) | (KAK0) | (KNY0) | ETT0 | ACS1 | (TWA1) |
| C | VAL0 [GUA0] | SPT0 BNG1 | FRD1 [API0] | (TUC0) [PPT0] | TEN1 | (LNP3) | [HON0] | ABG0 | SJG1 |
| D | UPP | HAD | | | | | | | |
| E | SOD LVV HYB | DOB (NEW) MPO | POD TYH [CNB] | NUR HRB | (MGD) GCK | LNN AAA1 | SVD PEN | KNS ASH | MNK [HTY] |
| X | | | | | | | | | |

| | JUNE 1982 | | | | | | 12/06 05:15 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK2 | SVD2 | PET2 | KIV2 | UBA0 | MMB3 | KAK3 | HTY3 | KNY3 |
| B | NOK0 | POD1 | VAL1 | YSS2 | EBR1 | [FRD1] | ASH2 | ABG0 | |
| C | KNS2 KGD0 [SJG0] | ESK- (NEW0) BNG1 | MNK1 ODE2 MPO2 | WNG2 AQU1 [ACS0] | WIT2 TFS0 [TWA0] | NGK0 TKT1 | GTT1 SPT0 | HAD- LNP3 | LVV2 (HON1) |
| D | KIR CNB | DOB | UPP | NKK | COI | MUT | GUA | PMG | GNA |
| E | SOD PEN | NUR HYB | LER ETT | MGD | LNN | TYH | HRB | GCK | AAA1 |
| X | | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JUNE 1982 | | | | | | | 15/06 10:20 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | POD2 HYB3 | SVD2 BNG1 | KIV2 MPO2 | KGD2 | UBA3 | AAA2 | TKT3 | ASH3 | ABG2 |
| B | NOK0 ETT0 | WNG2 | (PET2) | HRB3 | NKK1 | (MMB1) | TFS2 | (KAK1) | (KNY1) |
| C | KIR- HAD- LNP3 | SOD1 LVV2 [HON1] | YAK2 (YSS2) SJG1 | NUR1 ODE2 [PMG0] | ESK- AQU1 (TWA1) | WIT1 EBR2 | NGK0 SPT0 | VAL1 FRD1 | GTT1 [TUC0] |
| D | DOB | UPP | COI | TEN | MUT | | | | |
| E | LER | MGD | LNN | KNS | MNK | TYH | GCK | PEN | |
| X | (ACS) | | | | | | | | |

| | JUNE 1982 | | | | | | 15/06 14:10 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | POD2 | WNG3 | WIT1 (UBA0) TKT3 | | | | | | |
| B | NOK1 TYH2 | (YAK1) ODE2 | SVD1 NKK1 | ESK1 AAA1 | (PET0) | NGK0 | HAD2 | KIV2 | KGD0 |
| C | VAL0 [LNP0] | GTT1 [PMG0] | [YSS2] HUA2 | [MMB0] MPO2 | AQU1 TWA1 | TFS1 | SPT0 | [KAK0] | [KNY0] |
| D | KIR TUC | DOB TEN | LER SJG | UPP | LVV | NEW | EBR | COI | ASH |
| E | SOD PEN | NUR BNG | (MGD) | LNN | KNS | MNK | HRB | GCK | FRD |
| X | ACS | | | | | | | | |

| | JUNE 1982 | | | | | | | 15/06 15:11 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | HRB2 | (UBA0) | HUA2 | | | | | | |
| B | NOK0 NKK1 | SVD1 (AAA1) | ESK0 AQU1 | WNG3 PEN2 | (PET0) SJG1 | NGK0 (MPO2) | LVV2 TWA1 | TYH2 | ODE2 |
| C | SOD1 TFS1 | POD1 EBR1 | WIT1 SPT0 | VAL0 TUC0 | GTT1 TEN1 | HAD1 (HON1) | KIV1 [ETT0] | (KGD0) [PMG0] | NEW0 |
| D | KIR | DOB | NUR | LER | UPP | COI | ASH | | |
| E | (YAK) | (MGD) | LNN | KNS | MNK | GCK | FRD | BNG | |
| X | ACS | | | | | | | | |

| | JUNE 1982 | | | | | | | | 16/06 02:10 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET3 | | | | | | | | |
| B | YAK1<br>ABG0 | POD1<br>GUA0 | LNN2 | SVD2 | UBA2 | NKK1 | ASH2 | HTY3 | TUC2 |
| C | KNS2<br>YSS1<br>LNP3 | (WIT0)<br>ODE2<br>HON1 | (NGK0)<br>MMB1<br>MUT2 | (HAD-)<br>AAA1<br>ETT0 | KIV1<br>(AQU1)<br>PMG0 | (LVV2)<br>TFS0<br>[MPO1] | KGD0<br>TKT3<br>[TWA0] | (TYH1)<br>[SPT0] | (HRB0)<br>KAK2 |
| D | KIR<br>GNA | SOD<br>CNB | DOB<br>EYR | NUR | UPP | NEW | KNY | API | PPT |
| E | MGD | (PEN ) | HYB | [BNG ] | | | | | |
| X | NOK | MNK | [ACS ] | | | | | | |

| | JUNE 1982 | | | | | | | | 17/06 02:41 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MGD0 | SVD1 | PET2 | UBA0 | GUA1 | | | | |
| C | NOK0<br>ODE2<br>[SJG0] | POD2<br>MMB1<br>HYB1 | LNN1<br>AAA1<br>ETT0 | UPP0<br>TKT2<br>[BNG1] | (ESK-)<br>KAK2<br>PMG0 | (NGK0)<br>HTY1<br>PPT0 | KGD0<br>(TUC1)<br>[MPO1] | (HRB0)<br>KNY1<br>[TWA0] | YSS1<br>LNP3 |
| D | KIR<br>NEW<br>EYR | SOD<br>NKK | DOB<br>TFS | YAK<br>HON | NUR<br>ABG | KNS<br>MUT | MNK<br>API | KIV<br>GNA | LVV<br>CNB |
| E | ASH | | | | | | | | |
| X | [ACS ] | | | | | | | | |

| | JUNE 1982 | | | | | | | | 20/06 01:49 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MNK0<br>[COI3] | (WNG0)<br>ASH3 | PET2<br>GUA1 | (WIT2)<br>[MPO2] | (NGK1) | (HAD1) | (HRB0) | (AQU0) | [EBR0] |
| B | NOK0<br>UBA2 | YAK0<br>(ODE2) | (LER1)<br>NKK1 | SVD1<br>(FRD0) | (ESK1)<br>(PEN0) | (VAL0)<br>ABG0 | (KIV1)<br>[SJG0] | (LVV2)<br>PMG1 | KGD1 |
| C | POD0<br>HTY2<br>PPT0 | NEW0<br>TUC1<br>CNB1 | YSS2<br>KNY3<br>[TWA0] | MMB3<br>LNP3 | AAA2<br>HON2 | TFS2<br>MUT1 | TKT1<br>ETT0 | [SPT1]<br>[BNG1] | KAK3<br>API0 |
| D | KIR | DOB | NUR | UPP | KNS | GNA | EYR | | |
| E | SOD | MGD | LNN | (TYH) | (GCK) | HYB | | | |
| X | [ACS ] | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JUNE 1982 | | | | | | | | 20/06 04:02 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET1 | TYH1 | ASH3 | LNP3 | | | | | |
| B | NOK0 | SVD2 | LVV2 | (NEW1) | UBA3 | NKK1 | (TUC1) | GUA1 | |
| C | YAK1 | POD0 | ESK- | WIT1 | NGK0 | (VAL0) | KIV1 | KGD0 | HRB0 |
| | YSS2 | ODE2 | MMB3 | AAA3 | AQU0 | TKT3 | [FRD0] | KAK3 | HTY2 |
| | KNY3 | HON0 | [SJG0] | PMG0 | [TWA0] | | | | |
| D | KIR | SOD | DOB | NUR | LER | UPP | KNS | MNK | WNG |
| | GTT | TFS | PEN | ABG | MUT | API | GNA | CNB | EYR |
| E | MGD | LNN | GCK | HYB | (BNG ) | | | | |
| X | ETT | [ACS ] | | | | | | | |

| | JUNE 1982 | | | | | | | | 21/06 23:01 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD3 | (UPP1) | PET3 | NEW3 | TUC3 | HON3 | MUT2 | GUA3 | PPT3 |
| B | POD1 | (SVD0) | UBA3 | MMB3 | FRD1 | KAK3 | HTY3 | KNY3 | (SJG2) |
| | PMG1 | API2 | | | | | | | |
| C | NOK1 | YAK2 | (LER1) | (LNN1) | (MNK0) | (WNG0) | (WIT1) | (NGK0) | (VAL0) |
| | (HAD-) | (KIV1) | [HRB0] | YSS2 | [ODE2] | (AAA0) | [AQU0] | (TKT1) | LNP3 |
| | [ETT0] | | | | | | | | |
| D | KIR | SOD | CNB | | | | | | |
| E | [BNG ] | [MPO ] | | | | | | | |
| X | EYR | | | | | | | | |

| | JUNE 1982 | | | | | | | | 23/06 23:30 C |
|---|---|---|---|---|---|---|---|---|---|
| A | [HRB0] | [AQU0] | GUA1 | [TWA0] | | | | | |
| B | NOK0 | MGD1 | SVD0 | (MNK0) | NEW2 | UBA2 | TUC2 | HON2 | (ABG0) |
| | [MPO1] | | | | | | | | |
| C | POD2 | (ESK-) | PET1 | (NGK0) | (LVV2) | KGD0 | YSS1 | (ODE2) | (NKK1) |
| | MMB3 | AAA1 | (TKT1) | [SPT0] | KAK3 | HTY3 | KNY3 | LNP3 | MUT0 |
| | (ETT0) | PMG1 | API0 | PPT0 | | | | | |
| D | KIR | SOD | YAK | FRD | GNA | CNB | EYR | | |
| E | (LER ) | (LNN ) | [TYH ] | [BNG ] | | | | | |
| X | [ACS ] | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JUNE 1982 | | | | | | | | 25/06 21:32 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD3 | TUC3 | | | | | | | |
| B | YAK1 | (LER0) | UBA2 | FRD1 | PPT1 | | | | |
| C | NOK1 | POD2 | (LNN2) | (SVD1) | (ESK-) | (WIT0) | (NGK0) | (KGD0) | NEW1 |
| | (TYH1) | (HRB0) | YSS1 | MMB3 | (AAA0) | [AQU0] | KAK3 | HTY3 | KNY3 |
| | LNP3 | HON1 | SJG0 | GUA1 | [ETT0] | PMG1 | API0 | | |
| D | KIR | SOD | HUA | CNB | EYR | | | | |
| E | [BNG ] | | | | | | | | |
| X | PET | MUT | (ACS ) | | | | | | |

| | JUNE 1982 | | | | | | | | 26/06 00:45 C |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK3 | MGD3 | SVD2 | UBA3 | NKK2 | AAA3 | LNP3 | HON3 | GUA3 |
| | PPT2 | | | | | | | | |
| B | KNS0 | KGD1 | NEW2 | (ASH2) | TUC2 | API2 | GNA2 | CNB2 | EYR2 |
| C | NOK3 | KIR- | POD1 | (ESK-) | YSS2 | MMB3 | [AQU0] | (FRD1) | KAK3 |
| | HTY3 | KNY3 | ABG0 | ETT0 | [BNG1] | PMG1 | | | |
| D | SOD | LNN | PET | TKT | HYB | | | | |
| E | | | | | | | | | |
| X | (LVV ) | MUT | [ACS ] | | | | | | |

| | JUNE 1982 | | | | | | | | 26/06 09:40 C |
|---|---|---|---|---|---|---|---|---|---|
| A | POD1 | UBA2 | ASH2 | BNG1 | | | | | |
| B | NOK1 | MGD0 | UPP1 | SVD1 | PET1 | | | | |
| C | KIR- | SOD0 | YAK0 | ESK- | MNK1 | NGK0 | VAL0 | KGD0 | (NEW0) |
| | TYH1 | HRB0 | YSS1 | ODE2 | GCK3 | MMB0 | AAA2 | AQU1 | TFS2 |
| | TKT1 | SPT1 | PEN2 | KAK0 | KNY0 | LNP3 | ABG0 | HYB2 | [PMG0] |
| | MPO2 | [TWA1] | | | | | | | |
| D | DOB | NUR | LER | LNN | KNS | WNG | WIT | GTT | HAD KIV |
| | LVV | NKK | EBR | COI | HTY | TEN | MUT | ETT | |
| E | | | | | | | | | |
| X | (ACS ) | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JULY 1982 | | | | | | | | 04/07 04:39 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD3 | | | | | | | | |
| B | YAK2 | WNG1 | NGK2 | HRB2 | ABG1 | | | | |
| C | POD2 | SVD1 | MNK1 | PET1 | WIT1 | KIV0 | LVV2 | (NEW0) | TYH0 |
| | ODE2 | GCK0 | MMB3 | AQU0 | [FRD0] | KAK3 | [TUC1] | KNY3 | LNP3 |
| | HYB2 | ETT0 | BNG1 | MPO2 | [ACS0] | [TWA0] | | | |
| D | NOK | KIR | SOD | DOB | NUR | LER | LNN | UPP | KNS |
| | VAL | GTT | HAD | KGD | UBA | NKK | AAA | TFS | TKT |
| | EBR | PEN | HTY | HON | GUA | PMG | API | CNB | EYR |
| E | | | | | | | | | |
| X | ESK | YSS | ASH | MUT | GNA | | | | |

| | JULY 1982 | | | | | | | | 09/07 07:32 C |
|---|---|---|---|---|---|---|---|---|---|
| A | SOD1 | UPP2 | PET2 | KIV2 | KGD2 | HRB3 | UBA3 | MMB3 | AAA3 |
| | TKT3 | KAK3 | KNY3 | LNP3 | ABG2 | HYB3 | GUA3 | ETT3 | BNG1 |
| | MPO3 | GNA1 | | | | | | | |
| B | NOK2 | YAK2 | LER0 | WNG1 | WIT2 | NGK0 | LVV2 | YSS3 | ODE2 |
| | NKK1 | GCK1 | AQU1 | TFS2 | EBR1 | PEN1 | HTY3 | [TUC0] | [SJG0] |
| | MUT1 | PMG1 | | | | | | | |
| C | LNN1 | KNS0 | MNK0 | VAL0 | GTT1 | HAD- | [NEW0] | SPT1 | TEN1 |
| | [HON0] | [PPT0] | [ACS0] | [TWA0] | | | | | |
| D | KIR | NUR | COI | | | | | | |
| E | POD | MGD | SVD | TYH | | | | | |
| X | DOB | ESK | ASH | | | | | | |

| | JULY 1982 | | | | | | | | 09/07 21:06 C |
|---|---|---|---|---|---|---|---|---|---|
| A | NEW3 | UBA2 | FRD3 | TUC3 | HON1 | HUA3 | PPT1 | | |
| B | LER0 | (SVD0) | PET2 | [NKK1] | (AAA0) | SJG2 | | | |
| C | NOK0 | SOD1 | YAK1 | POD2 | (LNN1) | (KNS0) | (WIT0) | (NGK0) | (VAL0) |
| | (KIV1) | (KGD0) | YSS2 | [ODE2] | MMB3 | [AQU0] | [TFS1] | [TKT2] | KAK3 |
| | HTY3 | KNY3 | [ABG0] | GUA2 | PMG2 | API2 | [MPO1] | | |
| D | KIR | MGD | EYR | | | | | | |
| E | [BNG ] | | | | | | | | |
| X | (ESK ) | [ASH ] | (MUT ) | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JULY 1982 | | | | | | | | | 10/07 03:16 C |
|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | |
| B | POD1 | SVD2 | UBA0 | MMB1 | GUA2 | | | | | |
| C | NOK0 | KNS1 | PET1 | HRB0 | ODE2 | AAA1 | TFS1 | TKT2 | KAK1 | |
| | KNY1 | (MPO1) | | | | | | | | |
| D | KIR | SOD | DOB | YAK | NUR | LER | MGD | LNN | UPP | |
| | MNK | WNG | NGK | GTT | KIV | LVV | KGD | NEW | YSS | |
| | NKK | GCK | PEN | HTY | HON | ABG | HYB | ETT | PMG | API |
| | PPT | GNA | CNB | EYR | | | | | | |
| E | TYH | [BNG ] | | | | | | | | |
| X | (ESK ) | ASH | LNP | MUT | | | | | | |

| | JULY 1982 | | | | | | | | | 10/07 04:08 C |
|---|---|---|---|---|---|---|---|---|---|---|
| A | PET2 | GUA3 | | | | | | | | |
| B | YAK1 | POD1 | SVD0 | WNG1 | HRB0 | UBA0 | LNP3 | | | |
| C | NOK0 | KIR- | NGK0 | LVV2 | KGD0 | ODE2 | MMB1 | AAA2 | TFS1 | |
| | TKT2 | KAK1 | HTY3 | KNY1 | (BNG1) | PMG1 | (MPO2) | | | |
| D | SOD | DOB | NUR | LER | MGD | LNN | UPP | KNS | MNK | |
| | WIT | GTT | KIV | YSS | NKK | GCK | AQU | PEN | HON | |
| | ABG | HYB | ETT | API | GNA | CNB | EYR | | | |
| E | TYH | | | | | | | | | |
| X | ESK | ASH | MUT | | | | | | | |

| | JULY 1982 | | | | | | | | | 10/07 23:20 C |
|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | |
| B | YAK1 | POD1 | MGD3 | NEW1 | [HRB1] | UBA2 | (AAA0) | TUC2 | LNP3 | |
| | (ABG0) | | | | | | | | | |
| C | NOK1 | (SVD0) | PET2 | (NGK0) | YSS1 | MMB1 | [AQU0] | FRD1 | [PEN0] | |
| | KAK1 | HTY1 | KNY2 | [TEN1] | HON1 | GUA0 | (ETT0) | PMG1 | PPT0 | |
| | [MPO1] | | | | | | | | | |
| D | KIR | SOD | KGD | API | GNA | CNB | EYR | | | |
| E | [BNG ] | | | | | | | | | |
| X | (ESK ) | (ASH ) | MUT | | | | | | | |

| | JULY 1982 | | | | | | | | 19/07 03:51 C |
|---|---|---|---|---|---|---|---|---|---|
| A | UBA0 | | | | | | | | |
| B | HRB0 | LNP3 | | | | | | | |
| C | NOK0<br>AAA2<br>(MPO1) | POD0<br>TKT1<br>[ACS0] | SVD1<br>[FRD0]<br>[TWA0] | PET2<br>KAK1 | NGK0<br>(TUC0) | LVV2<br>KNY1 | (NEW1)<br>GUA2 | YSS2<br>ETT0 | MMB1<br>PMG0 |
| D | KIR<br>WNG<br>TFS<br>EYR | SOD<br>WIT<br>PEN | DOB<br>GTT<br>HTY | YAK<br>KGD<br>HON | NUR<br>TYH<br>ABG | LER<br>ODE<br>HYB | LNN<br>NKK<br>API | UPP<br>GCK<br>GNA | MNK<br>AQU<br>CNB |
| E | MGD | KNS | (BNG) | | | | | | |
| X | (ESK) | KIV | ASH | MUT | | | | | |

| | JULY 1982 | | | | | | | | 19/07 04:21 C |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK2 | UBA0 | | | | | | | |
| B | PET2 | HRB2 | | | | | | | |
| C | NOK2<br>(VAL0)<br>[FRD0]<br>PMG0 | KIR-<br>KGD0<br>PEN0<br>(MPO2) | SOD0<br>(NEW0)<br>KAK3<br>[ACS0] | POD1<br>YSS1<br>HTY0 | LER1<br>ODE2<br>KNY3 | SVD1<br>MMB3<br>LNP3 | KNS2<br>AAA2<br>ABG0 | WIT1<br>AQU0<br>HYB2 | NGK0<br>TKT2<br>ETT0 |
| D | DOB<br>NKK | NUR<br>GCK | LNN<br>TFS | UPP<br>HON | MNK<br>GUA | WNG<br>API | GTT<br>GNA | LVV<br>CNB | TYH<br>EYR |
| E | MGD | (EBR) | (BNG) | | | | | | |
| X | ESK | KIV | ASH | MUT | | | | | |

| | JULY 1982 | | | | | | | | 19/07 05:43 C |
|---|---|---|---|---|---|---|---|---|---|
| A | UBA2 | ABG0 | | | | | | | |
| B | YAK2<br>MPO2 | UPP1 | PET2 | MMB3 | KAK3 | KNY3 | LNP3 | HYB3 | ETT0 |
| C | SOD1<br>ODE2 | POD2<br>AAA1 | SVD1<br>[FRD0] | WIT1<br>HTY3 | NGK0<br>[TUC0] | GTT2<br>PMG0 | LVV2<br>[ACS0] | KGD0 | YSS1 |
| D | NOK<br>VAL<br>SPT | KIR<br>HAD<br>PEN | DOB<br>TYH<br>GUA | NUR<br>NKK<br>GNA | LER<br>GCK<br>CNB | LNN<br>AQU | KNS<br>TFS | MNK<br>EBR | WNG<br>COI |
| E | MGD | HRB | TKT | BNG | | | | | |
| X | ESK | KIV | ASH | MUT | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JULY 1982 | | | | | | | | 20/07 12:52 C |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD2 | WNG2 | KIV2 | SJG3 | HUA3 | | | | |
| B | SOD2 | (MGD0) | KNS1 | MNK2 | WIT3 | NGK2 | HAD2 | LVV2 | TYH1 |
| | ODE2 | FRD2 | PEN2 | TEN2 | BNG1 | MPO2 | | | |
| C | NOK0 | KIR- | POD2 | NUR1 | LNN3 | (PET1) | VAL0 | GTT1 | KGD0 |
| | (UBA2) | NKK2 | GCK3 | AQU2 | TFS2 | TKT2 | EBR1 | COI1 | SPT1 |
| | TUC0 | HYB2 | ETT0 | [PMG0] | ACS1 | TWA1 | | | |
| D | DOB | UPP | NEW | ABG | | | | | |
| E | LER | HRB | | | | | | | |
| X | ESK | AAA | ASH | [MUT] | | | | | |

| | JULY 1982 | | | | | | | | 22/07 05:10 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET2 | TKT3 | | | | | | | |
| B | (NEW1) | HRB1 | UBA3 | NKK1 | LNP3 | GUA2 | ETT0 | | |
| C | NOK0 | YAK1 | POD2 | WNG1 | WIT1 | NGK0 | VAL0 | GTT2 | LVV2 |
| | YSS2 | ODE2 | MMB3 | AAA2 | AQU1 | [FRD0] | KAK3 | HTY3 | [TUC0] |
| | KNY3 | (HON1) | [SJG1] | PMG0 | [PPT0] | MPO2 | GNA1 | [ACS0] | [TWA0] |
| D | KIR | DOB | NUR | LER | LNN | UPP | SVD | KNS | MNK |
| | HAD | KIV | GCK | TFS | EBR | SPT | PEN | ABG | CNB |
| E | MGD | TYH | HYB | BNG | | | | | |
| X | SOD | ESK | KGD | ASH | MUT | | | | |

| | AUGUST 1982 | | | | | | | | 08/08 02:04 C |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD3 | PET3 | (HRB2) | NKK2 | TKT3 | LNP3 | ABG2 | GUA2 | PPT2 |
| B | YAK1 | MGD0 | KNS1 | (LVV2) | KAK3 | HTY3 | TUC2 | KNY3 | HON2 |
| | HYB3 | GNA1 | | | | | | | |
| C | NOK0 | SOD1 | POD0 | (KIV1) | NEW1 | (TYH1) | YSS3 | (ODE2) | MMB3 |
| | TFS0 | [FRD0] | ETT0 | [BNG1] | PMG2 | API1 | CNB2 | EYR1 | |
| D | KIR | LNN | KGD | | | | | | |
| E | | | | | | | | | |
| X | (ESK) | UBA | AAA | ASH | MUT | | | | |

| | AUGUST 1982 | | | | | | | | 14/08 02:40 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | YAK1 | POD1 | SVD1 | PET2 | (HRB2) | (ODE2) | (AQU1) | | |
| C | NOK2 | SOD1 | (LER-) | MGD0 | (MNK0) | (WNG0) | (WIT1) | (NGK1) | (KIV1) |
| | (LVV2) | KGD0 | UBA2 | YSS1 | MMB1 | TFS1 | TKT2 | [EBR0] | (PEN0) |
| | KAK2 | HTY3 | KNY1 | LNP3 | ABG0 | HYB1 | ETT0 | PMG0 | PPT0 |
| | [MPO1] | [ACS0] | [TWA0] | | | | | | |
| D | KIR | NUR | LNN | KNS | NEW | NKK | AAA | HON | GUA API |
| | GNA | CNB | EYR | | | | | | |
| E | [BNG ] | | | | | | | | |
| X | (ESK ) | (TYH ) | ASH | MUT | | | | | |

| | AUGUST 1982 | | | | | | | | 14/08 04:00 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET2 | | | | | | | | |
| B | LVV2 | LNP3 | | | | | | | |
| C | NOK0 | YAK2 | POD2 | MGD0 | UPP1 | SVD1 | (WNG0) | NGK0 | KIV1 |
| | HRB1 | UBA0 | YSS1 | NKK1 | MMB3 | AAA1 | TFS1 | [FRD0] | KAK3 |
| | HTY3 | [TUC0] | KNY3 | [SJG0] | PMG0 | (MPO1) | [ACS0] | [TWA0] | |
| D | KIR | SOD | DOB | NUR | LNN | KNS | MNK | KGD | ODE |
| | GCK | TKT | PEN | HON | ABG | GUA | API | GNA | CNB |
| | EYR | | | | | | | | |
| E | (BNG ) | | | | | | | | |
| X | (ESK ) | TYH | ASH | HYB | MUT | ETT | | | |

| | AUGUST 1982 | | | | | | | | 14/08 05:06 C |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD3 | PET2 | HRB3 | NKK2 | TKT3 | | | | |
| B | YAK3 | KIV2 | ODE2 | MMB3 | KAK3 | KNY3 | LNP3 | GUA1 | ETT3 |
| | PMG1 | MPO2 | | | | | | | |
| C | NOK0 | SOD1 | POD2 | MGD0 | MNK1 | NGK1 | GTT1 | LVV2 | KGD1 |
| | UBA3 | YSS2 | GCK0 | AAA3 | AQU1 | TFS2 | (EBR0) | PEN1 | HTY3 |
| | ABG1 | HYB3 | BNG1 | GNA2 | CNB2 | | | | |
| D | KIR | DOB | NUR | LER | LNN | UPP | KNS | WNG | WIT |
| | HAD | API | EYR | | | | | | |
| E | | | | | | | | | |
| X | ESK | TYH | ASH | MUT | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | AUGUST 1982 | | | | | | | 27/08 03:24 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD2 | | | | | | | | |
| B | KIR- | SOD1 | POD1 | PET2 | KIV2 | ODE2 | NKK1 | AAA0 | LNP3 |
| C | NOK0 | (LER-) | MGD1 | LNN1 | (UPP1) | MNK1 | (WNG0) | (NGK1) | [VAL0] |
| | (HAD-) | (LVV2) | KGD0 | (TYH1) | UBA0 | YSS1 | MMB1 | (AQU1) | TFS0 |
| | TKT1 | [EBR0] | [SPT0] | [FRD0] | (PEN2) | KAK1 | HTY0 | KNY1 | [SJG0] |
| | GUA1 | ETT0 | [BNG1] | PMG0 | [HUA ] | PPT0 | [TWA0] | | |
| D | YAK | HON | ABG | API | GNA | CNB | EYR | | |
| E | NUR | KNS | (HRB ) | (GCK ) | HYB | (MPO ) | | | |
| X | (ESK ) | ASH | MUT | [ACS ] | | | | | |

| | AUGUST 1982 | | | | | | | 27/08 05:42 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | KGD2 | [HUA2] | | | | | | | |
| B | POD1 | SVD1 | PET1 | NKK1 | LNP3 | | | | |
| C | NOK0 | SOD0 | YAK0 | MGD0 | LNN1 | MNK1 | WNG0 | WIT0 | NGK1 |
| | (VAL0) | GTT1 | KIV1 | LVV2 | TYH1 | UBA0 | YSS1 | ODE2 | MMB1 |
| | AAA0 | AQU1 | TFS1 | TKT1 | (SPT1) | PEN1 | KAK1 | KNY1 | ABG0 |
| | HYB1 | GUA2 | BNG1 | PMG1 | [PPT0] | [TWA0] | | | |
| D | KIR | DOB | LER | UPP | HAD | EBR | HTY | ETT | GNA |
| | CNB | EYR | | | | | | | |
| E | NUR | KNS | HRB | GCK | MPO | | | | |
| X | ESK | ASH | MUT | [ACS ] | | | | | |

| | SEPTEMBER 1982 | | | | | | | 01/09 07:37 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | NKK2 | PEN3 | ASH3 | MPO2 | | | | | |
| B | SOD2 | POD1 | UPP1 | WNG2 | VAL | HRB2 | AQU1 | [FRD1] | LNP3 |
| | ABG1 | BNG1 | | | | | | | |
| C | NOK0 | YAK0 | NUR1 | MGD0 | LNN0 | SVD2 | KNS2 | MNK1 | PET1 |
| | WIT1 | NGK1 | KIV1 | TYH1 | UBA2 | YSS2 | ODE2 | GCK0 | MMB0 |
| | TFS1 | TKT0 | EBR0 | SPT1 | KAK0 | KNY0 | [SJG0] | GUA2 | ETT0 |
| | PMG0 | [PPT0] | GNA1 | [TWA1] | | | | | |
| D | KIR | DOB | LER | HAD | LVV | COI | TEN | CNB | |
| E | HYB | | | | | | | | |
| X | ESK | GTT | KGD | AAA | HTY | MUT | [ACS ] | | |

| SEPTEMBER 1982 | | | | | | | | 30/09 01:35 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | LNP3 | GUA2 | PPT2 | | | | | | |
| B | (ASH2) | API2 | [MPO1] | | | | | | |
| C | YAK0 | POD1 | MGD1 | PET2 | [LVV2] | UBA3 | YSS2 | MMB3 | KAK3 |
| | KNY3 | [BNG1] | PMG1 | GNA1 | [ACS0] | [TWA0] | EYR1 | | |
| D | KGD | NEW | AAA | TKT | HON | ABG | HYB | MUT | ETT |
| | CNB | | | | | | | | |
| E | | | | | | | | | |
| X | NOK | [ESK ] | HTY | | | | | | |

| OCTOBER 1982 | | | | | | | | 27/10 04:04 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | ASH3 | | | | | | | | |
| B | MGD0 | MMB3 | AAA1 | KAK3 | KNY3 | LNP3 | | | |
| C | NOK0 | YAK1 | POD2 | (UPP1) | SVD2 | (MNK0) | [WNG0] | PET2 | [WIT1] |
| | [NGK0] | [VAL0] | [GTT1] | KGD0 | (TYH0) | (HRB1) | UBA3 | YSS1 | (ODE2) |
| | NKK1 | TFS2 | TKT2 | [TUC0] | ABG0 | [SJG0] | HYB2 | MUT1 | GUA2 |
| | MPO0 | GNA1 | [ACS0] | [TWA0] | | | | | |
| D | KNS | HON | API | PPT | CNB | EYR | | | |
| E | (BNG ) | PMG | | | | | | | |
| X | (KIR ) | [ESK ] | (KIV ) | HTY | ETT | | | | |

| NOVEMBER 1982 | | | | | | | | 15/11 01:58 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | PET3 | MUT2 | GUA2 | PMG1 | EYR3 | | | | |
| B | MGD0 | [ODE2] | (AAA0) | LNP3 | API2 | | | | |
| C | (NOK0) | (POD1) | [UPP1] | (SVD1) | [KNS0] | [NGK0] | [VAL0] | (KGD0) | (NEW1) |
| | [HRB1] | UBA2 | YSS2 | MMB3 | [AQU0] | (TKT1) | [FRD0] | (ASH2) | KAK3 |
| | HTY3 | (TUC1) | KNY3 | HON1 | ABG0 | [SJG0] | ETT0 | (MPO1) | GNA2 |
| | [ACS0] | [TWA0] | | | | | | | |
| D | YAK | HYB | PPT | CNB | | | | | |
| E | [BNG ] | | | | | | | | |
| X | [ESK ] | | | | | | | | |

| | NOVEMBER 1982 | | | | | | | | 16/11 03:34 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET2 | ASH2 | | | | | | | |
| B | YAK1 | POD1 | MGD0 | (SVD1) | AAA0 | ABG1 | ETT0 | | |
| C | (NOK0) | [KIR-] | [MNK0] | [WNG0] | [NGK0] | [KIV1] | KGD0 | [NEW0] | UBA3 |
| | YSS1 | (ODE2) | NKK1 | MMB2 | (TFS1) | TKT2 | [SPT0] | KAK2 | HTY0 |
| | [TUC0] | KNY1 | LNP3 | HYB1 | MUT1 | PMG0 | MPO2 | CNB2 | |
| D | HON | GUA | API | PPT | GNA | EYR | | | |
| E | [TYH ] | [HRB ] | [BNG ] | | | | | | |
| X | [ESK ] | | | | | | | | |

| | NOVEMBER 1982 | | | | | | | | 20/11 05:29 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | ABG0 | ETT2 | | | | | | | |
| C | POD1 | UBA2 | MMB1 | TKT1 | KAK2 | HTY2 | KNY2 | HYB2 | PMG0 |
| | GNA1 | | | | | | | | |
| D | NOK | YAK | SVD | KNS | PET | KGD | YSS | ODE | NKK |
| | AAA | TFS | ASH | LNP | MUT | GUA | API | MPO | CNB |
| | EYR | | | | | | | | |
| E | BNG | | | | | | | | |
| X | (KIR) | [ESK ] | (KIV) | [SJG ] | | | | | |

| | DECEMBER 1982 | | | | | | | | 15/12 01:58 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD1 | PET3 | YSS3 | MMB3 | KAK3 | HTY3 | KNY3 | LNP3 | HON2 |
| | ABG0 | HYB3 | MUT2 | GUA3 | [BNG1] | PMG1 | API3 | PPT3 | GNA3 |
| | EYR3 | | | | | | | | |
| B | YAK2 | [SVD1] | [NGK1] | [ODE2] | (AAA1) | [TUC1] | | | |
| C | (NOK0) | (POD1) | [MNK0] | [WNG0] | [WIT0] | [VAL0] | [GTT0] | [KIV1] | (KGD0) |
| | UBA3 | [AQU0] | (TKT2) | [SPT1] | [FRD0] | (ASH1) | ETT0 | [ACS0] | (TWA0) |
| D | | | | | | | | | |
| E | [KNS ] | [TYH ] | [HRB ] | [GCK ] | [PEN ] | (MPO ) | CNB | | |
| X | [ESK ] | | | | | | | | |

| | DECEMBER 1982 | | | | | | | | 22/12 08:25 C |
|---|---|---|---|---|---|---|---|---|---|
| A | TKT3 | ASH3 | BNG1 | MPO2 | | | | | |
| B | [MGD0] | AAA0 | ETT1 | (ACS1) | | | | | |
| C | (NOK0)<br>(VAL0)<br>AQU0<br>(TWA1) | POD2<br>GTT1<br>TFS2 | UPP0<br>LVV2<br>SPT0 | SVD2<br>KGD0<br>[FRD0] | MNK0<br>[NEW0]<br>PEN2 | WNG1<br>UBA0<br>(KAK1) | [PET1]<br>ODE2<br>(KNY1) | WIT1<br>NKK2<br>LNP3 | NGK0<br>(MMB1)<br>ABG0 |
| D | NUR | LNN | EBR | COI | TEN | MUT | PMG | CNB | |
| E | (LER) | KNS | KIV | TYH | HRB | GCK | HYB | | |
| X | (KIR) | (ESK) | GNA | | | | | | |

| | DECEMBER 1982 | | | | | | | | 29/12 06:44 C |
|---|---|---|---|---|---|---|---|---|---|
| A | (LNN1)<br>GUA3 | AAA3<br>ETT3 | TFS3<br>BNG1 | TKT3<br>[HUA2] | PEN3<br>MPO3 | ASH3 | LNP3 | ABG2 | HYB3 |
| B | POD1<br>UBA3 | (LER0)<br>ODE2 | (MGD0)<br>NKK1 | SVD1<br>AQU1 | MNK1<br>[TUC0] | (VAL0)<br>GNA2 | KIV1 | LVV2 | KGD0 |
| C | (NOK0)<br>(COI2)<br>[ACS1] | (SOD1)<br>(SPT0)<br>(TWA1) | (WNG0)<br>KAK2<br>EYR2 | (PET2)<br>HTY3 | (WIT1)<br>KNY2 | (NGK1)<br>[SJG0] | [NEW0]<br>MUT2 | (YSS1)<br>PMG0 | MMB1<br>[PPT0] |
| D | CNB | | | | | | | | |
| E | KNS | (HAD) | TYH | HRB | GCK | | | | |
| X | (KIR) | (ESK) | (GTT) | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS - Summary List 1982

| JANUARY 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 09/01 | 11:24 | C | 2 A | 5 B | 18 C | 16 D | 1 E | 1 X |
| 21/01 | 10:21 | C | 25 A | 10 B | 6 C | 2 D | 22 E | 0 X |
| 22/01 | 04:50 | C | 1 A | 11 B | 14 C | 6 D | 23 E | 2 X |

| FEBRUARY 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 02/02 | 10:30 | C | 22 A | 4 B | 3 C | 1 D | 34 E | 2 X |
| 06/02 | 23:51 | C | 7 A | 11 B | 12 C | 3 D | 25 E | 3 X |
| 09/02 | 03:37 | C | 0 A | 9 B | 29 C | 9 D | 3 E | 1 X |
| 09/02 | 04:07 | C | 3 A | 11 B | 34 C | 5 D | 2 E | 3 X |
| 10/02 | 00:54 | C | 1 A | 5 B | 28 C | 5 D | 1 E | 2 X |
| 14/02 | 03:39 | C | 11 A | 22 B | 17 C | 4 D | 7 E | 1 X |
| 27/02 | 08:38 | C | 2 A | 18 B | 19 C | 4 D | 13 E | 3 X |

| MARCH 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 06/03 | 08:03 | C | 0 A | 1 B | 14 C | 37 D | 1 E | 1 X |
| 28/03 | 03:06 | C | 0 A | 5 B | 22 C | 16 D | 1 E | 3 X |
| 31/03 | 22:23 | C | 5 A | 9 B | 14 C | 8 D | 6 E | 3 X |

| APRIL 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12/04 | 11:27 | C | 13 A | 27 B | 19 C | 2 D | 1 E | 1 X |

| MAY 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 09/05 | 12:32 | C | 22 A | 22 B | 15 C | 0 D | 0 E | 2 X |

## DOUBTFUL SOLAR-FLARE EFFECTS - Summary List 1982 (continued)

| JUNE 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 04/06 | 14:20 | C | 37 A | 9 B | 8 C | 1 D | 0 E | 1 X |
| 07/06 | 08:27 | C | 3 A | 12 B | 23 C | 7 D | 20 E | 1 X |
| 08/06 | 09:08 | C | 21 A | 21 B | 16 C | 3 D | 2 E | 2 X |
| 08/06 | 20:00 | C | 5 A | 15 B | 26 C | 8 D | 6 E | 1 X |
| 26/06 | 19:06 | C | 2 A | 10 B | 31 C | 8 D | 6 E | 1 X |

| JULY 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 08/07 | 06:47 | C | 2 A | 7 B | 22 C | 11 D | 15 E | 4 X |
| 15/07 | 05:50 | C | 1 A | 10 B | 16 C | 11 D | 20 E | 4 X |
| 22/07 | 16:45 | C | 5 A | 11 B | 29 C | 6 D | 7 E | 4 X |

| AUGUST 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/08 | 08:45 | C | 9 A | 19 B | 24 C | 4 D | 5 E | 4 X |
| 27/08 | 10:18 | C | 14 A | 26 B | 18 C | 1 D | 2 E | 4 X |

| SEPTEMBER | None |
|---|---|

| OCTOBER 1982 | None |
|---|---|

| NOVEMBER 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 13/11 | 06:03 | C | 0 A | 5 B | 29 C | 12 D | 2 E | 4 X |
| 14/11 | 00:15 | C | 4 A | 14 B | 36 C | 2 D | 2 E | 3 X |
| 25/11 | 04:17 | C | 3 A | 8 B | 13 C | 2 D | 38 E | 2 X |
| 26/11 | 02:35 | C | 3 A | 9 B | 19 C | 6 D | 15 E | 2 X |

| DECEMBER 1982 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 13/12 | 03:15 | C | 1 A | 4 B | 24 C | 13 D | 1 E | 2 X |
| 17/12 | 01:45 | C | 3 A | 9 B | 23 C | 6 D | 7 E | 4 X |

# DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982

| | JANUARY 1982 | | | | | | | | 09/01 11:24 C |
|---|---|---|---|---|---|---|---|---|---|
| A | HAD2 | HRB3 | | | | | | | |
| B | WNG3 | WIT2 | TYH2 | [TUC1] | TEN1 | | | | |
| C | (POD2) | LER1 | [MGD0] | ESK- | MNK2 | [PET1] | NGK2 | GTT1 | KIV1 |
| | LVV2 | ODE2 | GCK3 | TFS2 | ABG0 | ETT0 | MPO1 | ACS1 | TWA1 |
| D | DOB | NUR | LNN | UPP | KNS | VAL | NKK | AQU | TKT |
| | EBR | COI | SPT | PEN | SJG | HYB | HUA | | |
| E | BNG | | | | | | | | |
| X | ASH | | | | | | | | |

| | JANUARY 1982 | | | | | | | | 21/01 10:21 |
|---|---|---|---|---|---|---|---|---|---|
| A | [YAK2] | (POD2) | NUR2 | LNN2 | UPP2 | KNS0 | WNG2 | WIT2 | NGK3 |
| | VAL2 | GTT3 | HAD1 | KIV2 | LVV3 | [NEW0] | TYH3 | HRB3 | ODE2 |
| | NKK2 | GCK1 | AQU1 | EBR1 | COI2 | [TUC1] | TEN1 | | |
| B | (NOK1) | ESK2 | [PET1] | KGD0 | (UBA2) | TFS2 | (LNP3) | ABG0 | [PMG0] |
| | TWA2 | | | | | | | | |
| C | KIR- | [YSS1] | SPT1 | (SJG1) | ACS1 | (CNB1) | | | |
| D | SOD | GNA | | | | | | | |
| E | DOB | LER | [MGD ] | SVD | [MMB ] | AAA1 | TKT | [FRD ] | PEN |
| | ASH | [KAK ] | [HTY ] | [KNY ] | [HON ] | HYB | (MUT ) | [GUA ] | ETT |
| | BNG | (HUA ) | [PPT ] | MPO | | | | | |

| | JANUARY 1982 | | | | | | | | 22/01 04:50 C |
|---|---|---|---|---|---|---|---|---|---|
| A | [TEN2] | | | | | | | | |
| B | (NOK1) | POD1 | PET2 | [NGK1] | [VAL0] | KGD0 | NKK1 | TFS0 | ASH2 |
| | LNP3 | ETT0 | | | | | | | |
| C | [NEW0] | (TYH1) | (ODE2) | MMB1 | (AQU0) | [SPT1] | KAK1 | [TUC1] | KNY1 |
| | ABG0 | [SJG1] | MUT0 | GUA0 | CNB1 | | | | |
| D | YAK | YSS | PMG | API | GNA | EYR | | | |
| E | (KIR ) | (SOD ) | [DOB ] | (NUR ) | [LER ] | MGD | (LNN ) | SVD | (KNS ) |
| | [WNG ] | [WIT1] | (KIV ) | (HRB ) | UBA | (GCK ) | AAA1 | TKT | (PEN ) |
| | HTY | HYB | (BNG ) | (PPT ) | MPO | | | | |
| X | (MNK ) | (LVV ) | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | FEBRUARY 1982 | | | | | | 02/02 10:30 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | [YAK1] | WNG3 | [PET1] | WIT0 | NGK1 | VAL2 | HAD1 | KGD2 | HRB2 |
| | [YSS2] | ODE2 | NKK2 | [MMB0] | EBR1 | COI3 | ASH3 | [KAK0] | [TUC0] |
| | [KNY0] | (LNP3) | [GUA1] | [PMG0] | | | | | |
| B | SOD0 | LVV2 | (CNB2) | [EYR1] | | | | | |
| C | KIR- | TYH1 | SPT1 | | | | | | |
| D | UPP | | | | | | | | |
| E | DOB | (POD ) | NUR | LER | [MGD ] | LNN | SVD | KNS | ESK |
| | MNK | GTT | KIV | GCK | AAA1 | AQU | TFS | TKT | [FRD ] |
| | PEN | [HTY ] | TEN | [HON ] | ABG | (SJG ) | HYB | ETT | BNG |
| | (HUA ) | [API ] | [PPT ] | MPO | GNA | ACS | TWA | | |
| X | (NOK ) | (UBA ) | | | | | | | |

| | FEBRUARY 1982 | | | | | | 06/02 23:51 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | (NOK0) | [NUR0] | [WIT1] | [HRB0] | [NKK2] | LNP3 | [ABG0] | | |
| B | [UPP1] | [SVD1] | PET2 | [NGK1] | [KGD0] | MMB1 | [AQU0] | KAK1 | KNY1 |
| | GUA0 | (ETT0) | | | | | | | |
| C | [VAL0] | [HAD-] | NEW0 | [ODE2] | (FRD1) | TUC0 | [TEN1] | PMG1 | (ACS0) |
| | CNB0 | (TWA0) | EYR1 | | | | | | |
| D | YSS | API | GNA | | | | | | |
| E | [SOD ] | [DOB ] | YAK | (POD ) | MGD | [LNN ] | [KNS ] | [MNK ] | [WNG ] |
| | [GTT ] | [KIV ] | [TYH ] | (UBA ) | [GCK ] | [AAA2] | [TFS ] | [TKT ] | [PEN ] |
| | HTY | HON | (HYB ) | MUT | [BNG ] | PPT | [MPO ] | | |
| X | [KIR ] | [LER ] | [LVV ] | | | | | | |

| | FEBRUARY 1982 | | | | | | 09/02 03:37 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | NOK0 | MGD0 | SVD1 | [WNG0] | UBA2 | NKK1 | ASH2 | ABG0 | (BNG1) |
| C | (SOD0) | YAK1 | POD0 | [LER2] | (LNN1) | (MNK0) | PET0 | [WIT1] | [NGK0] |
| | [VAL0] | (KIV1) | KGD0 | [TYH1] | [HRB0] | (ODE2) | [GCK0] | MMB1 | AAA0 |
| | [AQU1] | (TFS0) | [FRD0] | KAK1 | [TUC1] | KNY1 | LNP3 | MUT0 | ETT2 |
| | PMG1 | MPO1 | | | | | | | |
| D | YSS | TKT | HTY | HON | GUA | API | GNA | CNB | EYR |
| E | (KNS ) | HYB | PPT | | | | | | |
| X | [LVV ] | | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | FEBRUARY 1982 | | | | | | | | 09/02 04:07 C |
|---|---|---|---|---|---|---|---|---|---|
| A | POD2 | TKT3 | [COI2] | | | | | | |
| B | NOK1<br>[TUC0] | (NUR0)<br>(BNG1) | MGD0 | SVD1 | [WNG0] | PET2 | (HRB0) | UBA1 | NKK1 |
| C | (SOD1)<br>(TYH1)<br>(PEN1)<br>GUA2 | [LER2]<br>YSS1<br>ASH2<br>PMG1 | (LNN1)<br>(ODE2)<br>KAK1<br>[HUA2] | (MNK0)<br>(GCK0)<br>KNY1<br>MPO1 | [WIT1]<br>MMB1<br>[TEN1]<br>[ACS0] | [NGK0]<br>AAA1<br>LNP3<br>[TWA0] | [VAL0]<br>[AQU0]<br>HON1<br>EYR0 | (KIV1)<br>TFS1<br>ABG0 | KGD0<br>[SPT0]<br>MUT0 |
| D | HTY | HYB | API | GNA | CNB | | | | |
| E | (KNS ) | PPT | | | | | | | |
| X | YAK | (LVV ) | ETT | | | | | | |

| | FEBRUARY 1982 | | | | | | | | 10/02 00:54 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PPT3 | | | | | | | | |
| B | [SOD1] | [UPP1] | [SVD0] | API2 | EYR2 | | | | |
| C | [KIR-]<br>[TYH1]<br>HTY0<br>(TWA0) | (POD1)<br>UBA0<br>KNY3 | [LER2]<br>[ODE2]<br>HON1 | MGD0<br>MMB1<br>(HYB1) | [WNG0]<br>[AQU0]<br>MUT1 | PET2<br>[TFS2]<br>PMG1 | [WIT1]<br>(TKT2)<br>[MPO1] | [NGK0]<br>[PEN1]<br>GNA0 | (KGD0)<br>KAK3<br>[ACS0] |
| D | YAK | YSS | LNP | GUA | CNB | | | | |
| E | [BNG ] | | | | | | | | |
| X | [LVV ] | (AAA ) | | | | | | | |

| | FEBRUARY 1982 | | | | | | | | 14/02 03:39 C |
|---|---|---|---|---|---|---|---|---|---|
| A | POD1<br>[ACS0] | PET1<br>[TWA0] | (KIV2) | KGD2 | UBA2 | TKT0 | ABG1 | GUA2 | PMG0 |
| B | NOK2<br>AAA2<br>(BNG1) | SVD1<br>(TFS1)<br>API1 | (KNS0)<br>[EBR1]<br>MPO1 | [WNG0]<br>KAK1<br>EYR1 | [HAD1]<br>[TUC1] | YSS2<br>KNY1 | (ODE2)<br>LNP3 | NKK1<br>HYB1 | MMB1<br>ETT1 |
| C | [LER2]<br>[AQU1] | [ESK-]<br>[SPT0] | (MNK0)<br>(PEN2) | [WIT2]<br>ASH2 | [NGK0]<br>[TEN2] | [VAL0]<br>HON0 | (LVV2)<br>MUT0 | [NEW0]<br>CNB1 | [GCK0] |
| D | YAK | HTY | PPT | GNA | | | | | |
| E | (SOD ) | [DOB ] | (NUR ) | MGD | (LNN ) | [TYH ] | [HRB ] | | |
| X | [COI ] | | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | FEBRUARY 1982 | | | | | | | | 27/02 08:38 C |
|---|---|---|---|---|---|---|---|---|---|
| A | KGD0 | TKT0 | | | | | | | |
| B | NOK0<br>HAD1 | KIR-<br>KIV1 | SOD1<br>ODE2 | POD1<br>NKK1 | LER2<br>AAA1 | (MGD0)<br>AQU1 | MNK1<br>TFS2 | WNG1<br>COI0 | NGK0<br>LNP3 |
| C | ESK-<br>[TUC0]<br>(EYR0) | WIT1<br>TEN2 | VAL1<br>[HON0] | LVV1<br>ABG0 | [NEW0]<br>[SJG1] | HRB1<br>(GUA0) | UBA0<br>ETT0 | SPT0<br>[HUA1] | [FRD0]<br>(TWA1) |
| D | DOB | UPP | KNY | GNA | | | | | |
| E | NUR<br>HYB | LNN<br>BNG | SVD<br>[PPT ] | KNS<br>MPO | GTT | TYH | GCK | EBR | PEN |
| X | ASH | MUT | (ACS ) | | | | | | |

| | MARCH 1982 | | | | | | | | 06/03 08:03 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MPO2 | | | | | | | | |
| C | POD1<br>TKT0 | ESK-<br>ASH2 | WNG1<br>ABG0 | NGK0<br>HYB3 | KIV1<br>GNA2 | TYH- | HRB2 | UBA3 | ODE2 |
| D | NOK<br>SVD<br>YSS<br>KAK<br>CNB | KIR<br>KNS<br>NKK<br>HTY | SOD<br>MNK<br>GCK<br>KNY | DOB<br>WIT<br>AQU<br>TEN | YAK<br>VAL<br>TFS<br>LNP | NUR<br>GTT<br>EBR<br>MUT | LER<br>HAD<br>COI<br>GUA | LNN<br>LVV<br>SPT<br>ETT | UPP<br>KGD<br>PEN<br>PMG |
| E | BNG | | | | | | | | |
| X | AAA | | | | | | | | |

| | MARCH 1982 | | | | | | | | 28/03 03:06 |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MGD0 | PET1 | LNP3 | MUT1 | ETT0 | | | | |
| C | NOK0<br>YSS2<br>(MPO1) | (SOD0)<br>MMB1<br>[ACS0] | POD1<br>[SPT0]<br>CNB1 | [ESK-]<br>[FRD0]<br>[TWA0] | (NGK0)<br>ASH | (NEW0)<br>KAK1 | (TYH1)<br>KNY1 | (HRB0)<br>[TEN2] | UBA2<br>[HUA0] |
| D | YAK<br>HYB | SVD<br>GUA | KNS<br>PMG | KGD<br>API | NKK<br>PPT | TFS<br>GNA | TKT<br>EYR | HTY | HON |
| E | [BNG ] | | | | | | | | |
| X | (KIR ) | AAA | ABG | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | MARCH 1982 | | | | | | | 31/03 22:23 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | (NOK0) | (UBA0) | [TKT2] | [EBR0] | HUA3 | | | | |
| B | (POD1) | MGD0 | [ESK1] | PET1 | [HRB0] | [AQU1] | TUC1 | PPT2 | [MPO1] |
| C | [WIT1]<br>HTY1 | [NGK0]<br>KNY1 | NEW0<br>HON2 | [ODE2]<br>PMG1 | MMB1<br>API1 | [AAA0] | [TFS3] | [SPT0] | KAK1 |
| D | YSS | FRD | LNP | SJG | MUT | GUA | CNB | EYR | |
| E | [SOD ] | YAK | [SVD ] | [WNG ] | [TYH ] | [HYB ] | | | |
| X | [LNN ] | [UPP ] | [ASH ] | | | | | | |

| | APRIL 1982 | | | | | | | 12/04 11:27 | |
|---|---|---|---|---|---|---|---|---|---|
| A | DOB2<br>NKK2 | POD1<br>AAA3 | UPP3<br>TKT3 | SVD2<br>HUA3 | ESK2 | KIV2 | HRB3 | UBA2 | ODE2 |
| B | KIR-<br>VAL1<br>COI0 | SOD2<br>LVV1<br>PEN2 | NUR3<br>KGD1<br>ASH2 | (MGD0)<br>TYH2<br>[KAK0] | MNK2<br>GCK3<br>[KNY0] | WNG3<br>[MMB0]<br>ABG0 | [PET0]<br>AQU2<br>SJG2 | WIT2<br>TFS1<br>[MUT1] | NGK2<br>EBR1<br>MPO2 |
| C | (YAK0)<br>TEN2<br>TWA1 | KNS1<br>(LNP0) | GTT0<br>[HON0] | HAD-<br>HYB1 | (NEW0)<br>[GUA1] | [YSS1]<br>ETT0 | SPT2<br>[PMG0] | FRD0<br>[PPT1] | [TUC0]<br>ACS1 |
| D | LER | BNG | | | | | | | |
| E | LNN | | | | | | | | |
| X | NOK | | | | | | | | |

| | MAY 1982 | | | | | | | 09/05 12:32 | |
|---|---|---|---|---|---|---|---|---|---|
| A | KIR-<br>MNK2<br>TKT3 | SOD2<br>WNG2<br>FRD2 | (YAK1)<br>[PET1]<br>ASH3 | POD1<br>HAD2<br>HUA3 | NUR3<br>KIV2 | (MGD0)<br>NEW1 | LNN2<br>NKK2 | SVD3<br>AAA2 | ESK2<br>AQU2 |
| B | LER2<br>ODE2<br>ABG0 | KNS2<br>GCK2<br>SJG1 | WIT2<br>[MMB0]<br>[GUA1] | NGK1<br>COI2<br>MPO2 | VAL1<br>SPT2 | GTT2<br>PEN2 | KGD0<br>[KAK0] | TYH2<br>(TUC1) | HRB1<br>[KNY0] |
| C | NOK2<br>[MUT1] | DOB2<br>ETT0 | LVV2<br>BNG1 | [YSS1]<br>[GNA1] | TFS2<br>ACS1 | EBR1<br>TWA1 | TEN2 | [LNP0] | HYB0 |
| D | | | | | | | | | |
| E | | | | | | | | | |
| X | UPP | (UBA ) | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JUNE 1982 | | | | | | | | 04/06 14:20 |
|---|---|---|---|---|---|---|---|---|---|
| A | KIR-<br>WIT3<br>NKK2<br>PEN3<br>TWA2 | SOD3<br>NGK1<br>GCK3<br>ASH3 | DOB3<br>VAL1<br>AAA2<br>TUC3 | POD2<br>HAD2<br>AQU3<br>TEN3 | NUR2<br>KIV2<br>TKT3<br>SJG3 | LNN3<br>LVV3<br>EBR3<br>BNG1 | SVD3<br>TYH2<br>COI3<br>HUA2 | MNK3<br>HRB3<br>SPT2<br>MPO3 | WNG3<br>ODE2<br>FRD2<br>ACS2 |
| B | (YAK1) | LER2 | KNS2 | ESK1 | (PET1) | GTT2 | KGD1 | NEW2 | (UBA2) |
| C | NOK3 | (MGD0) | [YSS1] | TFS3 | [HON0] | (ABG1) | (HYB1) | [PMG0] | |
| D | UPP | | | | | | | | |
| E | | | | | | | | | |
| X | [MUT ] | | | | | | | | |

| | JUNE 1982 | | | | | | | | 07/06 08:27 C |
|---|---|---|---|---|---|---|---|---|---|
| A | WNG1 | KGD2 | ASH2 | | | | | | |
| B | NOK1<br>COI1 | UPP1<br>TEN1 | MNK0<br>GUA1 | PET0 | WIT1 | NGK0 | GTT0 | NKK1 | TFS1 |
| C | SOD1<br>KAK1<br>(PMG0) | VAL0<br>HTY1<br>[ACS0] | LVV1<br>[TUC0]<br>(CNB2) | [NEW0]<br>KNY1<br>[TWA0] | YSS1<br>LNP3<br>[EYR0] | MMB1<br>[HON1] | AQU0<br>ABG0 | SPT2<br>[SJG0] | (FRD0)<br>ETT0 |
| D | KIR | DOB | LER | ESK | HAD | BNG | GNA | | |
| E | YAK<br>HRB<br>[PPT ] | POD<br>UBA<br>MPO | NUR<br>ODE | MGD<br>GCK | LNN<br>AAA1 | SVD<br>TKT | KNS<br>EBR | KIV<br>PEN | TYH<br>HYB |
| X | MUT | | | | | | | | |

| | JUNE 1982 | | | | | | | | 08/06 09:08 C |
|---|---|---|---|---|---|---|---|---|---|
| A | KIR-<br>HRB2<br>BNG1 | POD2<br>ODE2<br>[PPT2] | NUR2<br>AAA2<br>MPO1 | MGD1<br>AQU2 | LNN2<br>TKT3 | SVD2<br>(FRD1) | HAD1<br>PEN2 | KGD2<br>[TUC0] | (NEW0)<br>(SJG1) |
| B | SOD1<br>GTT2<br>HYB2 | DOB0<br>KIV1<br>ETT2 | LER2<br>LVV2<br>[CNB2] | MNK2<br>TYH3 | WNG2<br>UBA2 | PET2<br>NKK1 | WIT2<br>GCK1 | NGK2<br>TFS2 | VAL2<br>EBR2 |
| C | NOK2<br>[HON2] | YAK0<br>ABG1 | YSS2<br>(GUA0) | MMB0<br>(PMG0) | SPT1<br>GNA1 | KAK0<br>[ACS1] | KNY0<br>[TWA1] | TEN2 | LNP1 |
| D | UPP | COI | HTY | | | | | | |
| E | KNS | ASH | | | | | | | |
| X | ESK | MUT | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JUNE 1982 | | | | | | | | 08/06 20:00 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD0 | (LNN1) | FRD1 | [BNG1] | HUA3 | | | | |
| B | NOK0 | (POD1) | (SVD1) | (WNG1) | PET0 | VAL0 | (LVV2) | NEW0 | (UBA2) |
| | [NKK1] | [AAA0] | [ASH2] | TUC0 | SJG0 | [MPO1] | | | |
| C | KIR- | (NUR1) | (MNK0) | (WIT1) | (NGK0) | (GTT0) | (KIV2) | (KGD0) | YSS1 |
| | (ODE2) | MMB0 | (AQU0) | [TFS2] | [TKT2] | (COI1) | (SPT0) | [PEN1] | KAK0 |
| | (KNY0) | (TEN1) | HON1 | [ABG0] | [ETT0] | PPT0 | ACS1 | TWA1 | |
| D | SOD | DOB | LER | ESK | HAD | HTY | GUA | API | |
| E | YAK | (KNS) | (TYH) | (HRB) | (GCK) | [HYB] | | | |
| X | [MUT] | | | | | | | | |

| | JUNE 1982 | | | | | | | | 26/06 19:06 C |
|---|---|---|---|---|---|---|---|---|---|
| A | NOK0 | (UBA2) | | | | | | | |
| B | SOD2 | YAK0 | (POD1) | LER0 | MGD0 | (SVD1) | WNG3 | [NKK1] | API1 |
| | PPT0 | | | | | | | | |
| C | NUR1 | ESK1 | (MNK1) | PET0 | WIT1 | NGK0 | VAL0 | GTT1 | HAD- |
| | (KIV1) | (KGD0) | NEW0 | (TYH1) | YSS1 | (ODE2) | MMB0 | [AAA0] | (AQU1) |
| | [TFS0] | [TKT1] | SPT1 | FRD1 | (KAK0) | TUC1 | (KNY0) | [ABG0] | [MUT1] |
| | [ETT0] | HUA0 | [MPO1] | TWA1 | | | | | |
| D | KIR | DOB | UPP | EBR | COI | TEN | HON | SJG | |
| E | LNN | (HRB) | (GCK) | [HYB] | [BNG] | [CNB] | | | |
| X | ACS | | | | | | | | |

| | JULY 1982 | | | | | | | | 08/07 06:47 |
|---|---|---|---|---|---|---|---|---|---|
| A | UBA0 | ABG2 | | | | | | | |
| B | NOK0 | KIR- | PET1 | NKK1 | AAA0 | LNP3 | BNG1 | | |
| C | LNN1 | SVD1 | WIT1 | NGK0 | VAL0 | GTT1 | KIV0 | KGD0 | HRB0 |
| | YSS1 | ODE2 | MMB0 | AQU0 | TFS0 | SPT0 | [FRD0] | KAK0 | KNY0 |
| | MUT0 | ETT0 | [ACS0] | [TWA0] | | | | | |
| D | YAK | UPP | HAD | LVV | EBR | COI | HTY | TEN | PMG |
| | GNA | CNB | | | | | | | |
| E | SOD | POD | NUR | LER | MGD | KNS | MNK | WNG | TYH |
| | GCK | TKT | PEN | HYB | [PPT] | MPO | | | |
| X | DOB | ESK | ASH | GUA | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | JULY 1982 | | | | | | 15/07 05:50 | | |
|---|---|---|---|---|---|---|---|---|---|
| A | UBA2 | | | | | | | | |
| B | NOK0<br>PMG0 | YAK1 | POD1 | PET1 | NGK0 | NKK1 | COI0 | LNP1 | ABG0 |
| C | MNK0<br>TFS1 | WIT1<br>SPT0 | VAL0<br>[FRD0] | GTT1<br>KAK0 | KGD0<br>KNY0 | YSS1<br>[ACS0] | ODE2<br>[TWA0] | MMB0 | AQU0 |
| D | NUR<br>GUA | LNN<br>GNA | WNG | HAD | KIV | LVV | EBR | PEN | HTY |
| E | KIR<br>HRB<br>MPO | SOD<br>GCK<br>CNB | DOB<br>AAA1 | LER<br>TKT | MGD<br>[TUC ] | SVD<br>HYB | KNS<br>ETT | (NEW )<br>BNG | TYH<br>[PPT ] |
| X | UPP | ESK | ASH | MUT | | | | | |

| | JULY 1982 | | | | | | 22/07 16:45 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | UPP1 | WNG3 | NEW0 | HRB3 | HUA3 | | | | |
| B | NOK1<br>TUC1 | KIR-<br>SJG1 | (POD1) | (MGD0) | (SVD0) | LVV3 | ODE2 | (NKK1) | [AAA0] |
| C | SOD1<br>HAD-<br>TEN1<br>[MPO1] | NUR0<br>KIV1<br>[LNP3]<br>ACS1 | LNN3<br>(YSS1)<br>HON0<br>TWA1 | MNK1<br>(MMB0)<br>[GUA0] | (PET1)<br>AQU0<br>[ETT0] | WIT1<br>(TFS1)<br>BNG1 | NGK1<br>[TKT3]<br>[PMG0] | VAL1<br>[KAK0]<br>PPT0 | GTT1<br>[KNY0] |
| D | DOB | GCK | EBR | COI | SPT | PEN | | | |
| E | (YAK ) | LER | KNS | TYH | [UBA ] | FRD | [HYB ] | | |
| X | ESK | (KGD ) | (ASH ) | [MUT ] | | | | | |

| | AUGUST 1982 | | | | | | 11/08 08:45 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD2 | PET2 | HRB3 | UBA2 | NKK2 | AAA2 | TKT3 | BNG1 | MPO0 |
| B | NOK2<br>MMB0<br>[PPT0] | YAK1<br>AQU1 | LER1<br>TFS2 | UPP1<br>PEN1 | VAL2<br>KAK0 | HAD2<br>KNY0 | LVV2<br>LNP3 | [NEW0]<br>ABG2 | ODE2<br>ETT1 |
| C | SOD0<br>COI2<br>(PMG0) | MNK1<br>SPT1<br>[HUA0] | WIT3<br>(FRD1)<br>GNA1 | NGK0<br>HTY0<br>[ACS1] | GTT1<br>[TUC0]<br>(CNB2) | KIV1<br>TEN1<br>[TWA1] | KGD0<br>[HON1] | YSS2<br>HYB2 | EBR1<br>(GUA2) |
| D | KIR | DOB | NUR | WNG | | | | | |
| E | MGD | LNN | KNS | TYH | GCK | | | | |
| X | POD | ESK | ASH | MUT | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| AUGUST 1982 | | | | | | | | 27/08 10:18 | |
|---|---|---|---|---|---|---|---|---|---|
| A | KIR-<br>TKT3 | (MGD2)<br>COI2 | SVD2<br>(FRD2) | (PET1)<br>[TUC0] | KIV2<br>(HUA1) | KGD2 | HRB3 | NKK2 | AAA3 |
| B | NOK2<br>NGK2<br>TFS2 | SOD2<br>VAL1<br>PEN2 | NUR1<br>HAD2<br>[HON1] | LER2<br>LVV3<br>SJG2 | LNN1<br>[NEW0]<br>[GUA1] | UPP1<br>TYH2<br>BNG1 | KNS2<br>ODE2<br>[PPT0] | MNK2<br>GCK2<br>(GNA2) | WNG2<br>AQU2 |
| C | YAK0<br>(KAK0) | POD2<br>(HTY0) | WIT2<br>(KNY0) | GTT2<br>TEN1 | UBA3<br>(LNP1) | (YSS2)<br>ABG0 | (MMB0)<br>ETT0 | EBR1<br>[PMG0] | SPT1<br>(TWA1) |
| D | DOB | | | | | | | | |
| E | HYB | MPO | | | | | | | |
| X | ESK | ASH | (MUT) | (ACS) | | | | | |

| SEPTEMBER | None |
|---|---|

| OCTOBER 1982 | None |
|---|---|

| NOVEMBER 1982 | | | | | | | | 13/11 06:03 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | (KIR-) | (MGD1) | NKK1 | AAA0 | ETT0 | | | | |
| C | NOK0<br>KIV1<br>(SPT0)<br>[ACS0] | POD0<br>LVV2<br>[FRD0]<br>[TWA0] | (LER-)<br>KGD0<br>KAK1 | SVD2<br>UBA2<br>[TUC0] | KNS2<br>YSS1<br>KNY2 | (PET0)<br>ODE2<br>LNP3 | (WIT1)<br>MMB1<br>ABG0 | (NGK0)<br>(AQU0)<br>[SJG0] | [VAL0]<br>TKT1<br>MPO2 |
| D | YAK<br>GNA | GCK<br>CNB | TFS<br>EYR | PEN | ASH | HTY | MUT | GUA | PMG |
| E | (HRB) | HYB | | | | | | | |
| X | (ESK) | MNK | (TYH) | BNG | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | NOVEMBER 1982 | | | | | | | | 14/11 00:15 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET2 | [ASH3] | [BNG1] | PPT1 | | | | | |
| B | [SOD1] | MGD0 | [SVD1] | [KNS0] | [WNG0] | [KIV2] | [HRB1] | [AAA1] | [AQU1] |
| | [COI2] | [SJG2] | GUA1 | [MPO1] | GNA1 | | | | |
| C | (NOK1) | YAK1 | (POD2) | [LER-] | [MNK0] | [WIT2] | [NGK0] | [VAL0] | [GTT0] |
| | [HAD-] | [LVV2] | (UBA3) | YSS1 | [ODE2] | [NKK1] | [GCK0] | MMB1 | [TFS3] |
| | [TKT3] | [EBR0] | [SPT1] | [FRD0] | KAK2 | HTY2 | TUC0 | KNY2 | [TEN1] |
| | LNP3 | HON1 | (ABG0) | MUT0 | (ETT0) | PMG1 | API1 | (ACS0) | (TWA0) |
| D | NEW | CNB | | | | | | | |
| E | [TYH ] | [PEN ] | | | | | | | |
| X | [KIR ] | [ESK ] | EYR | | | | | | |

| | NOVEMBER 1982 | | | | | | | | 25/11 04:17 C |
|---|---|---|---|---|---|---|---|---|---|
| A | (NOK0) | KGD2 | [HUA2] | | | | | | |
| B | [UPP1] | PET1 | [NGK0] | (LVV2) | NKK1 | [TUC0] | LNP3 | [SJG1] | |
| C | [LER2] | [VAL0] | (ODE2) | MMB1 | [AQU1] | (TFS1) | [SPT0] | KAK1 | KNY1 |
| | (HON0) | ABG0 | [ACS0] | [TWA0] | | | | | |
| D | YAK | GNA | | | | | | | |
| E | [KIR ] | [SOD ] | [DOB ] | POD | [NUR ] | MGD | (LNN ) | SVD | (KNS ) |
| | (MNK ) | [WNG ] | [WIT1] | [GTT ] | [HAD ] | (KIV ) | [NEW ] | [TYH ] | [HRB ] |
| | UBA | YSS | (GCK ) | AAA | TKT | [EBR ] | [FRD ] | (PEN ) | ASH |
| | HTY | HYB | MUT | GUA | ETT | (BNG ) | API | PPT | MPO |
| | CNB | EYR | | | | | | | |
| X | [ESK ] | PMG | | | | | | | |

| | NOVEMBER 1982 | | | | | | | | 26/11 02:35 C |
|---|---|---|---|---|---|---|---|---|---|
| A | [HUA0] | [ACS0] | [TWA0] | | | | | | |
| B | (NOK0) | [UPP1] | (SVD1) | [WNG0] | PET2 | (KGD0) | AAA0 | [TFS0] | ABG0 |
| C | YAK1 | [LNN1] | [MNK0] | [WIT1] | [NGK0] | [VAL0] | [KIV1] | YSS1 | MMB1 |
| | [AQU0] | (TKT2) | [SPT0] | KAK1 | KNY1 | LNP3 | GUA1 | PMG0 | PPT0 |
| | (MPO0) | | | | | | | | |
| D | HON | MUT | ETT | API | GNA | EYR | | | |
| E | [SOD ] | (POD ) | [NUR ] | [LER ] | MGD | [KNS ] | [TYH ] | [HRB ] | UBA |
| | [GCK ] | (ASH ) | HTY | HYB | [BNG ] | CNB | | | |
| X | [ESK ] | [SJG ] | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1982 (continued)

| | DECEMBER 1982 | | | | | | | | | 13/12 03:15 C |
|---|---|---|---|---|---|---|---|---|---|---|
| A | MGD0 | | | | | | | | | |
| B | [HRB1] | ETT1 | MPO2 | CNB2 | | | | | | |
| C | (NOK0)<br>[LVV2]<br>[TUC1] | [SOD0]<br>[TYH1]<br>KNY1 | YAK1<br>YSS1<br>LNP3 | (POD2)<br>[ODE2]<br>GUA1 | (SVD2)<br>MMB1<br>[ACS0] | [MNK0]<br>[AQU1]<br>[TWA0] | PET2<br>[PEN1] | [NGK0]<br>(ASH1) | [KIV1]<br>KAK1 | |
| D | KGD<br>PPT | UBA<br>GNA | TKT<br>EYR | HTY | HON | ABG | HYB | MUT | PMG | API |
| E | [BNG ] | | | | | | | | | |
| X | [ESK ] | AAA | | | | | | | | |

| | DECEMBER 1982 | | | | | | | | 17/12 01:45 C |
|---|---|---|---|---|---|---|---|---|---|
| A | (NOK0) | [LNN1] | API2 | | | | | | |
| B | [UPP0] | [SVD2] | PET2 | (AAA0) | GUA1 | PMG1 | PPT2 | (MPO1) | GNA1 |
| C | (POD2)<br>MMB1<br>LNP3 | [MNK0]<br>[AQU0]<br>HON1 | [WNG0]<br>(TKT2)<br>[SJG0] | [NGK0]<br>[PEN1]<br>MUT1 | [VAL0]<br>[ASH1]<br>ETT0 | [KIV1]<br>KAK1 | (KGD0)<br>HTY1 | (NEW0)<br>(TUC0) | [ODE2]<br>KNY1 |
| D | YAK | YSS | ABG | HYB | CNB | EYR | | | |
| E | [SOD ] | [DOB ] | MGD | [KNS ] | [TYH ] | [HRB ] | [BNG ] | | |
| X | [KIR ] | [ESK ] | UBA | (NKK ) | | | | | |

# SECTION 5

## 5.3. List of sfe 1983


- Solar-flare effects 1983

  Summary list 183

  Extended list 185

- Doubtful solar-flare effects 1983

  Summary list 193

  Extended list 195

# SOLAR-FLARE EFFECTS - Summary List 1983

| JANUARY 1983 | None |
|---|---|

| FEBRUARY 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 03/02 | 05:58 | C | 14 A | 6 B | 18 C | 6 D | 0 E | 7 X |

| MARCH 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 16/03 | 03:42 | C | 0 A | 4 B | 26 C | 10 D | 2 E | 2 X |
| 17/03 | 09:10 | C | 6 A | 19 B | 20 C | 7 D | 2 E | 3 X |
| 17/03 | 13:34 | C | 1 A | 19 B | 24 C | 8 D | 1 E | 2 X |
| 17/03 | 20:11 | C | 4 A | 8 B | 27 C | 3 D | 2 E | 2 X |

| APRIL 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 05/04 | 04:25 | C | 11 A | 19 B | 24 C | 5 D | 5 E | 3 X |
| 27/04 | 02:53 | C | 2 A | 5 B | 14 C | 19 D | 4 E | 1 X |

| MAY 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01/05 | 13:14 | C | 8 A | 15 B | 24 C | 6 D | 8 E | 2 X |
| 07/05 | 22:17 | C | 13 A | 7 B | 24 C | 0 D | 2 E | 2 X |
| 09/05 | 23:04 | C | 10 A | 8 B | 16 C | 1 D | 1 E | 3 X |
| 10/05 | 12:08 | C | 7 A | 14 B | 25 C | 6 D | 1 E | 4 X |

| JUNE 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 06/06 | 13:37 | C | 10 A | 14 B | 21 C | 6 D | 6 E | 1 X |
| 11/06 | 06:50 | C | 6 A | 16 B | 28 C | 11 D | 1 E | 1 X |
| 16/06 | 15:34 | C | 14 A | 24 B | 11 C | 1 D | 0 E | 3 X |
| 26/06 | 14:07 | C | 16 A | 20 B | 8 C | 3 D | 6 E | 2 X |

## SOLAR-FLARE EFFECTS - Summary List 1983

| JULY 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01/07 | 13:32 | C | 4 A | 10 B | 23 C | 9 D | 0 E | 4 X |

| AUGUST 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01/08 | 12:28 | C | 4 A | 8 B | 28 C | 9 D | 1 E | 2 X |
| 04/08 | 03:41 | C | 6 A | 10 B | 20 C | 14 D | 1 E | 2 X |
| 12/08 | 12:37 | C | 3 A | 11 B | 14 C | 15 D | 13 E | 2 X |
| 17/08 | 02:32 | C | 2 A | 4 B | 23 C | 14 D | 1 E | 1 X |
| 17/08 | 19:06 | C | 3 A | 3 B | 14 C | 6 D | 1 E | 1 X |
| 19/08 | 03:07 | C | 2 A | 1 B | 11 C | 23 D | 1 E | 4 X |

| SEPTEMBER 1983 | None |
|---|---|

| OCTOBER 1983 | None |
|---|---|

| NOVEMBER 1983 | None |
|---|---|

| DECEMBER 1983 | None |
|---|---|

# SOLAR-FLARE EFFECTS (sfe) 1983

Times of commencements of solar-flare effects (sfe). The letter C indicates that the sfe is confirmed. The list of the observatories reporting a movement (A, B, C), or not (D, E, X, see text) are given for each event; normal brackets indicate stations in the twilight zone, square brackets stations in the nightside of earth.
The list of the collaborating 69 observatories is given below. They are identified by their IAGA three letter code, with alternative codes given in brackets (see list in Section 2, pages 29-36).

NOK KIR SOD DOB YAK POD NUR LER MGD LNN UPP SVD KZN(KNS) ESK MNK WNG PET WIT NGK VAL GTT HAD KIV LVV KGD NEW THY(TYH) HRB UBA YSS ODE NKK GCK MMB AAA AQU TFS TKT EBR COI TOL(SPT) FRD PEG(PEN) ASH KAK HTY TUC KNY SZT(TEN) LNP HON ABG SJG HYB MUT GUA ETT BNG PMG HUA API PPT CTO(CTA) LMM(MPO) GNA LAS(ACS) CAN(CNB) TRN(TWA) EYR

| JANUARY 1983 | None |
|---|---|

| FEBRUARY 1983 | | | | | | | 03/02 05:58 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | POD2 | (PET2) | MMB3 | TKT3 | ASH3 | KAK3 | HTY3 | KNY3 | LNP3 |
| | ABG3 | HYB3 | ETT3 | MPO3 | CNB3 | | | | |
| B | (MGD1) | KGD0 | YSS1 | ODE2 | PEN1 | GNA1 | | | |
| C | (SOD1) | SVD2 | (NGK0) | [VAL0] | (HAD-) | KIV1 | UBA3 | NKK1 | (AQU0) |
| | TFS1 | [FRD0] | [SJG0] | GUA1 | PMG0 | [HUA2] | [PPT0] | [ACS1] | [TWA1] |
| D | NOK | YAK | MNK | GCK | MUT | EYR | | | |
| E | | | | | | | | | |
| X | (KIR) | KNS | (ESK) | LVV | AAA | BNG | CTA | | |

| MARCH 1983 | | | | | | | 16/03 03:42 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MGD1 | SVD1 | PET1 | KGD0 | | | | | |
| C | NOK0 | POD0 | (LNN1) | (MNK0) | (NGK1) | (GTT0) | [HAD-] | (LVV2) | (HRB0) |
| | UBA2 | MMB1 | AAA0 | KAK1 | HTY2 | KNY2 | LNP3 | ABG0 | MUT1 |
| | GUA1 | ETT0 | PMG1 | PPT0 | (MPO2) | [ACS0] | TWA0] | EYR0 | |
| D | YAK | KNS | YSS | NKK | TFS | TKT | HON | HYB | API |
| | GNA | | | | | | | | |
| E | (BNG) | CNB | | | | | | | |
| X | ASH | CTA | | | | | | | |

| | MARCH 1983 | | | | | | | | 17/03 09:10 C |
|---|---|---|---|---|---|---|---|---|---|
| A | LNN3 | UPP3 | KIV2 | KGD1 | HRB2 | ODE2 | | | |
| B | SOD2 | DOB1 | NUR2 | SVD1 | MNK2 | WNG3 | WIT1 | NGK2 | VAL0 |
| | GTT2 | LVV2 | TYH2 | UBA0 | GCK1 | AQU1 | EBR1 | COI1 | [TUC0] |
| | ABG0 | | | | | | | | |
| C | NOK0 | (YAK0) | POD2 | (MGD0) | (PET1) | HAD- | [NEW0] | NKK1 | AAA1 |
| | TFS2 | TKT2 | SPT1 | [FRD0] | TEN2 | LNP3 | [SJG0] | ETT0 | MPO2 |
| | (ACS0) | (TWA0) | | | | | | | |
| D | KIR | LER | KNS | KNY | HYB | MUT | GNA | | |
| E | PEN | BNG | | | | | | | |
| X | ESK | ASH | (CTA ) | | | | | | |

| | MARCH 1983 | | | | | | | | 17/03 13:34 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MPO3 | | | | | | | | |
| B | LER2 | ESK- | WNG3 | VAL1 | HAD2 | (NEW0) | HRB3 | [UBA2] | ODE2 |
| | COI1 | FRD2 | SJG2 | | | | | | |
| C | (NOK1) | SOD0 | (POD2) | [MGD0] | LNN2 | SVD1 | MNK1 | [PET1] | WIT2 |
| | NGK2 | KIV1 | LVV2 | (KGD0) | TYH1 | GCK3 | AQU1 | EBR2 | SPT1 |
| | PEN2 | TUC1 | TEN2 | HUA0 | ACS1 | TWA1 | | | |
| D | KIR | DOB | NUR | UPP | KNS | GTT | NKK | TFS | |
| E | BNG | | | | | | | | |
| X | ASH | [CTA ] | | | | | | | |

| | MARCH 1983 | | | | | | | | 17/03 20:11 C |
|---|---|---|---|---|---|---|---|---|---|
| A | FRD3 | TUC3 | HON3 | HUA3 | | | | | |
| B | (YAK0) | [SVD1] | NEW3 | [HRB1] | [UBA0] | SJG2 | PPT0 | EYR2 | |
| C | [NOK0] | [POD2] | MGD0 | [LNN2] | [MNK0] | [WNG0] | PET1 | [WIT1] | [NGK1] |
| | (VAL0) | [GTT1] | [HAD-] | [KIV1] | [LVV2] | [KGD0] | [ODE1] | [AAA0] | [AQU0] |
| | [TFS1] | [PEN1] | (TEN1) | [LNP3] | [ABG0] | (GUA1) | [MPO0] | ACS0 | TWA0 |
| D | PMG | API | CNB | | | | | | |
| E | [TYH ] | [BNG ] | | | | | | | |
| X | [ASH ] | (CTA ) | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | APRIL 1983 | | | | | | | | 05/04 04:25 C |
|---|---|---|---|---|---|---|---|---|---|
| A | POD2<br>ASH3 | MGD2<br>ABG1 | LNN1 | SVD2 | PET2 | KGD2 | AAA3 | TKT3 | [COI3] |
| B | NOK3<br>(VAL0)<br>ETT1 | KIR-<br>(HAD2) | SOD1<br>KIV2 | (LER-)<br>LVV3 | KNS2<br>TYH0 | (ESK1)<br>(AQU1) | MNK1<br>TFS2 | (WNG0)<br>[FRD0] | (NGK1)<br>LNP3 |
| C | (WIT0)<br>(SPT0)<br>(PPT0) | (GTT0)<br>KAK2<br>MPO2 | [NEW1]<br>HTY3<br>GNA2 | UBA2<br>KNY1<br>[ACS0] | YSS2<br>[TEN1]<br>CNB2 | ODE2<br>[SJG0]<br>[TWA0] | NKK2<br>GUA1 | MMB2<br>(BNG1) | (EBR1)<br>PMG1 |
| D | UPP | HON | MUT | API | EYR | | | | |
| E | (DOB) | NUR | HRB | GCK | HYB | | | | |
| X | YAK | PEN | CTA | | | | | | |

| | APRIL 1983 | | | | | | | | 27/04 02:53 C |
|---|---|---|---|---|---|---|---|---|---|
| A | LNN1 | TKT2 | | | | | | | |
| B | MGD0 | ASH2 | LNP3 | GUA2 | [MPO0] | | | | |
| C | NOK0<br>AAA2 | POD2<br>[FRD0] | SVD1<br>MUT1 | (ESK-)<br>ETT0 | PET1<br>PMG0 | (LVV2) | KGD0 | UBA2 | MMB0 |
| D | KIR<br>KAK<br>EYR | SOD<br>HTY | YAK<br>KNY | NUR<br>HON | MNK<br>ABG | KIV<br>HYB | YSS<br>API | NKK<br>PPT | TFS<br>GNA |
| E | KNS | (PEN) | [BNG] | CNB | | | | | |
| X | CTA | | | | | | | | |

| | MAY 1983 | | | | | | | | 01/05 13:14 C |
|---|---|---|---|---|---|---|---|---|---|
| A | KIR- | ESK1 | KGD1 | HRB3 | TKT2 | COI2 | FRD2 | HUA3 | |
| B | NOK0<br>NKK1 | SOD2<br>AAA0 | (MGD1)<br>AQU1 | SVD1<br>ASH2 | WNG2<br>TUC1 | NGK2<br>ABG0 | GTT2 | HAD1 | KIV2 |
| C | (YAK0)<br>ODE2<br>[MUT1] | NUR2<br>GCK0<br>(ETT0) | UPP1<br>[MMB0]<br>[PMG0] | [PET1]<br>TFS0<br>[GNA1] | VAL1<br>[KAK0]<br>ACS0 | LVV2<br>[KNY0]<br>TWA0 | TYH1<br>[LNP3] | (UBA2)<br>[HON0] | [YSS1]<br>SJG0 |
| D | DOB | LER | NEW | EBR | SPT | TEN | | | |
| E | POD | LNN | KNS | MNK | WIT2 | (HYB) | BNG | MPO | |
| X | PEN | [CTA] | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | MAY 1983 | | | | | | | 07/05 22:17 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK3 | MGD2 | PET2 | NEW1 | FRD1 | TUC1 | LNP3 | HON2 | SJG1 |
| | GUA3 | HUA3 | PPT2 | CNB3 | | | | | |
| B | POD1 | (SVD1) | (ESK1) | (KGD0) | [AQU0] | KNY3 | EYR1 | | |
| C | NOK0 | (SOD1) | (KNS0) | [WIT1] | (VAL0) | [GTT0] | [KIV1] | [LVV2] | [HRB0] |
| | UBA3 | YSS2 | [ODE2] | [NKK1] | MMB3 | (AAA1) | [TKT2] | [EBR1] | KAK3 |
| | HTY3 | MUT0 | PMG1 | API1 | [MPO1] | (GNA1) | | | |
| D | | | | | | | | | |
| E | [ASH ] | [BNG ] | | | | | | | |
| X | [PEN ] | CTA | | | | | | | |

| | MAY 1983 | | | | | | 09/05 23:04 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK3 | PET3 | NEW1 | KAK3 | TUC3 | KNY3 | LNP3 | HON3 | GUA3 |
| | CNB3 | | | | | | | | |
| B | MGD1 | (SVD1) | (KGD0) | MMB3 | FRD1 | HTY3 | API2 | EYR2 | |
| C | NOK1 | POD0 | (ESK-) | [KIV1] | [LVV2] | UBA3 | YSS3 | (AAA0) | [AQU0] |
| | [ASH ] | (SJG1) | MUT0 | [ETT0] | PMG2 | [MPO1] | GNA1 | | |
| D | PPT | | | | | | | | |
| E | [BNG ] | | | | | | | | |
| X | (KIR) | [PEN ] | CTA | | | | | | |

| | MAY 1983 | | | | | | 10/05 12:08 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | (YAK1) | (PET2) | AQU3 | TFS3 | ASH3 | BNG1 | MPO3 | | |
| B | POD1 | LNN1 | SVD2 | ESK1 | MNK2 | WNG2 | HAD1 | KGD1 | HRB3 |
| | ODE2 | GCK3 | EBR2 | TEN2 | SJG1 | | | | |
| C | NOK0 | SOD1 | NUR1 | LER- | (MGD0) | KNS2 | WIT2 | NGK2 | VAL0 |
| | GTT1 | KIV1 | LVV2 | TYH0 | UBA2 | [YSS2] | AAA1 | TKT3 | SPT2 |
| | (TUC0) | [HON0] | ABG0 | HYB2 | ETT0 | HUA2 | ACS0 | | |
| D | DOB | UPP | NKK | COI | FRD | TWA | | | |
| E | [EYR ] | | | | | | | | |
| X | KIR | PEN | [API ] | [CTA ] | | | | | |

| | JUNE 1983 | | | | | | | | 06/06 13:37 C |
|---|---|---|---|---|---|---|---|---|---|
| A | WNG3<br>MPO3 | KIV2 | KGD1 | HRB3 | AAA2 | AQU3 | COI2 | ASH3 | HUA2 |
| B | NOK1<br>NKK1 | LER0<br>TFS1 | (MGD1)<br>TKT- | SVD1<br>TUC0 | MNK0<br>ACS0 | (PET1) | WIT2 | NGK1 | TYH0 |
| C | (YAK0)<br>GCK0<br>(HYB0) | UPP1<br>[MMB0]<br>[MUT0] | ESK-<br>EBR1<br>TWA0 | VAL0<br>SPT2 | GTT2<br>PEN0 | LVV2<br>[LNP3] | NEW0<br>[HON0] | [YSS1]<br>ABG0 | ODE2<br>SJG0 |
| D | KIR | SOD | NUR | HAD | FRD | TEN | | | |
| E | DOB | POD | LNN | KNS | (UBA ) | BNG | | | |
| X | [CTA ] | | | | | | | | |

| | JUNE 1983 | | | | | | | | 11/06 06:50 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET2 | KGD1 | AAA3 | TKT3 | ABG2 | [HUA0] | | | |
| B | POD1<br>AQU2 | MGD1<br>ASH2 | LNN2<br>HYB3 | SVD2<br>MUT1 | MNK1<br>MPO3 | WNG3<br>[ACS0] | KIV2<br>[TWA0] | HRB2 | ODE2 |
| C | NOK2<br>LVV2<br>PEN1<br>GNA1 | SOD1<br>TYH0<br>KAK0 | YAK1<br>UBA2<br>[TUC0] | NUR1<br>YSS2<br>KNY0 | ESK-<br>NKK1<br>TEN1 | WIT1<br>GCK0<br>LNP3 | NGK1<br>MMB0<br>ETT0 | VAL0<br>TFS1<br>PMG0 | GTT1<br>SPT1<br>[PPT0] |
| D | KIR<br>GUA | DOB<br>CNB | LER | UPP | KNS | HAD | EBR | COI | HTY |
| E | BNG | | | | | | | | |
| X | CTA | | | | | | | | |

| | JUNE 1983 | | | | | | | | 16/06 15:34 C |
|---|---|---|---|---|---|---|---|---|---|
| A | SOD3<br>FRD3 | (YAK2)<br>(ASH3) | (POD2)<br>TUC3 | NUR2<br>HUA3 | SVD2<br>ACS2 | WNG3 | KIV2 | HRB3 | COI3 |
| B | NOK1<br>(PET1)<br>AQU3 | KIR-<br>WIT3<br>EBR3 | DOB2<br>NGK2<br>SPT3 | LER2<br>VAL0<br>TEN2 | (MGD0)<br>HAD2<br>SJG2 | LNN1<br>LVV2<br>TWA2 | KNS2<br>(KGD0) | ESK2<br>TYH1 | MNK2<br>ODE2 |
| C | (UBA2)<br>(MPO2) | NKK-<br>[CNB2] | GCK1 | (AAA1) | TFS1 | PEN2 | [HTY1] | BNG1 | [PMG0] |
| D | NEW | | | | | | | | |
| E | | | | | | | | | |
| X | UPP | GTT | [CTA ] | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | JUNE 1983 | | | | | | 26/06 14:07 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | WNG3 | WIT3 | KIV2 | KGD0 | HRB3 | AQU3 | EBR2 | COI3 | SPT3 |
| | FRD2 | ASH3 | TEN3 | BNG1 | HUA2 | MPO3 | ACS1 | | |
| B | NOK0 | SOD1 | DOB2 | (YAK1) | (MGD0) | UPP1 | SVD2 | ESK0 | (PET2) |
| | NGK2 | VAL1 | GTT0 | HAD0 | LVV2 | ODE2 | GCK3 | TFS0 | TUC0 |
| | [MUT1] | TWA1 | | | | | | | |
| C | LER0 | NEW0 | (UBA0) | TKT2 | PEN1 | SJG1 | [GNA0] | [CNB2] | |
| D | KIR | NUR | NKK | | | | | | |
| E | POD | LNN | KNS | MNK | AAA2 | (HYB) | | | |
| X | TYH | [CTA] | | | | | | | |

| | JULY 1983 | | | | | | 01/07 13:32 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | WNG3 | COI3 | ASH3 | HUA2 | | | | | |
| B | POD1 | UPP2 | KIV2 | LVV2 | HRB3 | ODE2 | GCK3 | AQU2 | SPT2 |
| | ACS1 | | | | | | | | |
| C | NOK0 | SOD2 | LER- | (MGD0) | LNN1 | SVD1 | ESK- | MNK1 | (PET0) |
| | WIT2 | NGK2 | VAL0 | HAD0 | KGD0 | TYH0 | NKK- | AAA0 | TFS1 |
| | EBR2 | TUC0 | TEN2 | BNG1 | MPO2 | | | | |
| D | KIR | DOB | NUR | KNS | NEW | TKT | FRD | ABG | SJG |
| E | | | | | | | | | |
| X | GTT | PEN | [GUA] | TWA | | | | | |

| | AUGUST 1983 | | | | | | 01/08 12:28 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | COI2 | ASH3 | ABG1 | BNG1 | | | | | |
| B | WNG2 | KIV2 | TYH1 | HRB3 | GCK3 | FRD2 | SJG1 | MPO2 | |
| C | NOK0 | SOD2 | (YAK0) | POD1 | NUR0 | LER1 | (MGD1) | SVD2 | KNS1 |
| | ESK- | MNK2 | (PET0) | WIT2 | NGK2 | GTT0 | HAD- | LVV2 | KGD0 |
| | ODE2 | AAA1 | AQU2 | TFS2 | EBR1 | SPT1 | TEN2 | HYB2 | ACS1 |
| | TWA1 | | | | | | | | |
| D | DOB | LNN | UPP | VAL | NEW | NKK | TKT | ETT | HUA |
| E | KIR | | | | | | | | |
| X | (UBA) | PEN | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | AUGUST 1983 | | | | | | | | 04/08 03:41 C |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD2 | PET3 | NKK2 | ASH3 | ABG0 | [HUA0] | | | |
| B | KGD1<br>ETT0 | ODE2 | MMB3 | (AQU2) | KAK3 | HTY3 | KNY3 | LNP3 | HYB2 |
| C | NOK0<br>AAA2<br>GNA1 | YAK0<br>TFS2<br>CNB2 | POD2<br>TKT3 | MGD0<br>HON0 | KNS2<br>MUT1 | (GTT1)<br>GUA1 | (HAD-)<br>PMG2 | UBA2<br>CTA1 | YSS2<br>(MPO2) |
| D | KIR<br>TYH | SOD<br>HRB | DOB<br>GCK | NUR<br>API | LNN<br>EYR | UPP | NGK | KIV | LVV |
| E | (BNG ) | | | | | | | | |
| X | MNK | PEN | | | | | | | |

| | AUGUST 1983 | | | | | | | | 12/08 12:37 C |
|---|---|---|---|---|---|---|---|---|---|
| A | KGD2 | ODE2 | HUA2 | | | | | | |
| B | NOK0<br>TKT- | (MGD0)<br>BNG1 | SVD2 | [PET1] | NGK1 | VAL1 | KIV2 | (UBA0) | AQU0 |
| C | SOD1<br>FRD0 | UPP1<br>[LNP3] | WNG2<br>[MUT0] | LVV2<br>[PMG0] | (NEW0)<br>[PPT0] | [YSS2] | NKK- | TFS0 | SPT1 |
| D | KIR<br>COI | DOB<br>TEN | LER<br>ABG | KNS<br>SJG | ESK<br>ETT | WIT<br>TWA | HAD | GCK | EBR |
| E | (YAK )<br>ASH | POD<br>HYB | NUR<br>MPO | LNN<br>[CNB ] | MNK | TYH | HRB | AAA2 | PEN |
| X | GTT | ACS | | | | | | | |

| | AUGUST 1983 | | | | | | | | 17/08 02:32 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PET2 | ABG0 | | | | | | | |
| B | (AQU1) | LNP3 | GUA2 | PPT1 | | | | | |
| C | NOK0<br>NEW0<br>MUT1 | POD1<br>UBA3<br>[MPO0] | (LER-)<br>YSS1<br>GNA1 | MGD0<br>MMB0<br>CNB2 | SVD2<br>TKT2<br>EYR0 | (ESK-)<br>KAK0 | [VAL0]<br>KNY0 | (LVV2)<br>HON0 | KGD0<br>HYB1 |
| D | KIR<br>HTY | SOD<br>ETT | YAK<br>PMG | LNN<br>API | KNS<br>CTA | NKK | AAA | TFS | ASH |
| E | [BNG ] | | | | | | | | |
| X | (PEN ) | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| AUGUST 1983 | | | | | | | | | 17/08 19:06 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD1 | HON0 | HUA1 | | | | | | |
| B | NEW2 | [AAA0] | FRD3 | | | | | | |
| C | [SVD1] | (KNS2) | ESK- | PET1 | VAL0 | [KGD0] | [UBA0] | [TKT2] | TUC0 |
| | TEN1 | SJG2 | ACS0 | TWA0 | (EYR0) | | | | |
| D | DOB | LER | HAD | COI | API | PPT | | | |
| E | [BNG ] | | | | | | | | |
| X | [PEN ] | | | | | | | | |

| AUGUST 1983 | | | | | | | | | 19/08 03:07 C |
|---|---|---|---|---|---|---|---|---|---|
| A | UBA3 | ASH3 | | | | | | | |
| B | LNP3 | | | | | | | | |
| C | YAK0 | POD0 | MGD0 | PET3 | MMB0 | KAK0 | HTY0 | KNY0 | HYB2 |
| | ETT0 | PMG0 | | | | | | | |
| D | NOK | SOD | NUR | LNN | SVD | KNS | MNK | KIV | KGD |
| | YSS | ODE | NKK | TFS | TKT | HON | MUT | GUA | API |
| | PPT | CTA | GNA | CNB | EYR | | | | |
| E | [BNG ] | | | | | | | | |
| X | KIR | AAA | (PEN ) | ABG | | | | | |

| SEPTEMBER 1983 | None |
|---|---|

| OCTOBER 1983 | None |
|---|---|

| NOVEMBER 1983 | None |
|---|---|

| DECEMBER 1983 | None |
|---|---|

## DOUBTFUL SOLAR-FLARE EFFECTS - Summary List 1983

| JANUARY 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 24/01 | 10:00 | C | 4 A | 13 B | 23 C | 7 D | 10 E | 4 X |

| FEBRUARY 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 05/02 | 13:37 | C | 4 A | 2 B | 6 C | 3 D | 50 E | 4 X |

| MARCH 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 17/03 | 10:04 | C | 16 A | 21 B | 21 C | 2 D | 2 E | 2 X |
| 18/03 | 01:57 | C | 0 A | 4 B | 12 C | 16 D | 2 E | 4 X |
| 18/03 | 04:39 | C | 0 A | 5 B | 25 C | 10 D | 3 E | 4 X |

| APRIL 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 09/04 | 04:57 | C | 1 A | 4 B | 19 C | 21 D | 10 E | 2 X |

| MAY 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01/05 | 02:55 | C | 2 A | 8 B | 22 C | 12 D | 3 E | 3 X |
| 12/05 | 02:54 | C | 4 A | 8 B | 7 C | 0 D | 50 E | 4 X |
| 14/05 | 07:25 | C | 12 A | 14 B | 27 C | 4 D | 7 E | 3 X |
| 15/05 | 08:46 | C | 7 A | 6 B | 22 C | 13 D | 6 E | 3 X |

| JUNE 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 02/06 | 15:33 | C | 10 A | 27 A | 18 C | 2 D | 2 E | 4 X |
| 26/06 | 04:32 | C | 8 A | 16 B | 24 C | 13 D | 3 E | 2 X |

| JULY 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 04/07 | 11:55 | C | 5 A | 3 B | 39 C | 11 D | 1 E | 3 X |

## DOUBTFUL SOLAR-FLARE EFFECTS - Summary List 1983 (continued)

| AUGUST 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12/08 | 05:48 | C | 1 A | 7 B | 20 C | 24 D | 6 E | 1 X |
| 13/08 | 04:27 | C | 4 A | 9 B | 22 C | 8 D | 18 E | 2 X |
| 13/08 | 18:11 | C | 3 A | 14 B | 30 C | 8 D | 7 E | 1 X |

| SEPTEMBER 1983 | None |
|---|---|

| OCTOBER 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 05/10 | 15:01 | C | 3 A | 7 B | 21 C | 7 D | 1 E | 6 X |
| 10/10 | 10:45 | C | 1 A | 12 B | 38 C | 7 D | 1 E | 4 X |
| 15/10 | 04:25 | C | 6 A | 13 B | 24 C | 6 D | 6 E | 3 X |

| NOVEMBER 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 05/11 | 04:12 | C | 0 A | 1 B | 17 C | 16 D | 1 E | 1 X |
| 08/11 | 01:52 | C | 6 A | 9 B | 22 C | 3 D | 18 E | 3 X |

| DECEMBER 1983 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 07/12 | 00:44 | C | 1 A | 8 B | 27 C | 1 D | 19 E | 0 X |

# DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1983

| | JANUARY 1983 | | | | | | 24/01 10:00 | | |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD2 | TKT3 | ASH3 | BNG1 | | | | | |
| B | (POD1) ABG0 | LER0 [PPT0] | LNN1 ACS1 | ESK- TWA1 | [PET1] | KIV1 | LVV2 | KGD0 | TFS2 |
| C | (NOK0) (UBA0) (MUT0) | KIR- ODE2 ETT0 | [YAK0] [MMB0] [PMG0] | NUR1 AQU1 (HUA2) | [MGD0] SPT1 GNA0 | WIT2 [KAK0] | VAL0 [TUC0] | GTT1 [KNY0] | HAD0 (LNP3) |
| D | SOD | DOB | UPP | NGK | EBR | PEN | TEN | | |
| E | KNS (CNB ) | MNK | WNG | TYH | HRB | GCK | AAA2 | HYB | MPO |
| X | [YSS ] | NKK | COI | (CTA ) | | | | | |

| | FEBRUARY 1983 | | | | | | 05/02 13:37 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | [NOK0] | WNG3 | NGK1 | COI2 | | | | | |
| B | VAL1 | (KGD0) | | | | | | | |
| C | MNK1 | TFS1 | [LNP3] | (ABG0) | BNG1 | [PMG0] | | | |
| D | KIR | UPP | SPT | | | | | | |
| E | (SOD ) ESK HRB EBR SJG [GNA ] | DOB [PET0] [UBA ] FRD (HYB ) ACS | [YAK ] WIT [YSS ] (ASH ) [MUT ] [CNB ] | [POD ] GTT ODE [KAK ] [GUA ] TWA | NUR HAD (NKK ) [HTY ] (ETT ) [EYR ] | LER KIV GCK (TUC ) HUA | [MGD ] LVV [MMB ] [KNY ] [API ] | LNN (NEW ) AQU TEN [PPT ] | (SVD ) TYH (TKT ) [HON ] MPO |
| X | (KNS ) | [AAA ] | PEN | [CTA ] | | | | | |

| | MARCH 1983 | | | | | | 17/03 10:04 | | |
|---|---|---|---|---|---|---|---|---|---|
| A | KIR- HRB0 | SOD3 ODE2 | POD3 AAA2 | NUR2 AQU2 | (MGD1) TKT3 | LNN3 COI2 | SVD3 (FRD1) | KIV2 | KGD2 |
| B | DOB1 VAL1 (SJG3) | LER2 GTT1 (MUT1) | KNS2 LVV3 [PPT1] | ESK1 TYH3 | MNK2 UBA0 | WNG3 GCK3 | [PET2] TFS2 | WIT2 [TUC0] | NGK2 ABG0 |
| C | NOK3 (KAK0) GNA1 | (YAK0) (KNY0) ACS0 | HAD1 (LNP1) (TWA0) | [NEW0] HYB1 | (YSS1) [GUA1] | NKK1 ETT0 | [MMB0] [PMG0] | EBR1 (HUA1) | SPT1 MPO0 |
| D | UPP | TEN | | | | | | | |
| E | PEN | BNG | | | | | | | |
| X | ASH | [CTA ] | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | MARCH 1983 | | | | | | | | 18/03 01:57 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | POD1 | (SVD1) | PET2 | KGD1 | | | | | |
| C | NOK0<br>[SPT0] | YAK0<br>MUT0 | MGD0<br>PMG1 | [HAD-] | [LVV2] | [HRB0] | UBA0 | AAA0 | TKT1 |
| D | YSS<br>GUA | MMB<br>ETT | KAK<br>API | HTY<br>PPT | KNY<br>GNA | LNP<br>CNB | HON<br>EYR | ABG | HYB |
| E | [TYH ] | [BNG ] | | | | | | | |
| X | [MNK ] | NKK | (ASH ) | CTA | | | | | |

| | MARCH 1983 | | | | | | | | 18/03 04:39 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | SVD1 | PET1 | KGD0 | AAA2 | LNP3 | | | | |
| C | NOK0<br>(HRB0)<br>KAK1 | POD2<br>UBA2<br>HTY1 | MGD0<br>ODE2<br>KNY2 | (ESK-)<br>NKK1<br>MUT1 | (WNG0)<br>MMB1<br>PMG1 | (NGK0)<br>TFS1<br>MPO2 | (HAD-)<br>TKT1<br>CNB2 | KIV1<br>[SPT0] | LVV2<br>PEN0 |
| D | SOD<br>EYR | NUR | LNN | KNS | YSS | ABG | GUA | API | GNA |
| E | HYB | ETT | (BNG ) | | | | | | |
| X | YAK | MNK | ASH | CTA | | | | | |

| | APRIL 1983 | | | | | | | | 09/04 04:57 C |
|---|---|---|---|---|---|---|---|---|---|
| A | KGD2 | | | | | | | | |
| B | SVD1 | TKT- | LNP3 | ABG0 | | | | | |
| C | NOK0<br>AAA1<br>[TWA0] | YAK1<br>TFS1 | POD0<br>[FRD0] | KNS1<br>KAK0 | PET1<br>KNY0 | (VAL0)<br>PMG2 | GTT0<br>[HUA0] | UBA0<br>[ACS0] | MMB0<br>CNB2 |
| D | KIR<br>LVV<br>GNA | SOD<br>YSS<br>EYR | DOB<br>ODE | LNN<br>NKK | UPP<br>GCK | MNK<br>AQU | WNG<br>HTY | WIT<br>GUA | NGK KIV<br>API |
| E | NUR<br>MPO | MGD | TYH | HRB | ASH | HYB | MUT | ETT | BNG |
| X | PEN | CTA | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | MAY 1983 | | | | | | | 01/05 02:55 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD2 | MUT2 | | | | | | | |
| B | SOD1 | YAK2 | PET2 | (AQU0) | ASH2 | ABG0 | GUA2 | ETT0 | |
| C | POD1 | MGD0 | LNN1 | (WNG0) | (NGK0) | (VAL0) | KIV1 | KGD0 | NEW0 |
| | (HRB0) | UBA0 | YSS1 | ODE2 | MMB1 | AAA2 | TFS1 | [EBR0] | KAK1 |
| | HTY2 | KNY2 | LNP3 | [MPO2] | | | | | |
| D | KIR | NUR | MNK | NKK | TKT | HON | PMG | API | PPT |
| | GNA | CNB | EYR | | | | | | |
| E | KNS | HYB | [BNG ] | | | | | | |
| X | NOK | (PEN ) | CTA | | | | | | |

| | MAY 1983 | | | | | | 12/05 02:54 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | NOK0 | KGD2 | MMB2 | LNP3 | | | | | |
| B | (ESK1) | ODE2 | NKK- | (AQU1) | TFS2 | KAK3 | KNY3 | ABG0 | |
| C | UPP1 | (VAL0) | [SPT1] | [BNG1] | PMG0 | [ACS0] | [TWA0] | | |
| D | | | | | | | | | |
| E | SOD | DOB | YAK | POD | NUR | (LER ) | MGD | LNN | SVD |
| | KNS | MNK | (WNG ) | PET | (WIT) | (NGK ) | (GTT ) | KIV | NEW |
| | (HRB ) | UBA | YSS | (GCK ) | AAA2 | TKT | [EBR ] | [FRD ] | ASH |
| | (TUC ) | [TEN ] | HON | [SJG ] | HYB | MUT | GUA | ETT | API |
| | PPT | [MPO ] | @GNA | CNB | EYR | | | | |
| X | KIR | (PEN ) | HTY | CTA | | | | | |

| | MAY 1983 | | | | | | | 14/05 07:25 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | NOK0 | SVD3 | ESK2 | WNG2 | VAL2 | KIV2 | KGD1 | ODE2 | AQU2 |
| | [FRD1] | ASH3 | [HUA0] | | | | | | |
| B | SOD1 | KNS1 | MNK1 | WIT1 | NGK1 | HAD2 | LVV2 | [NEW0] | TYH1 |
| | HRB2 | GCK1 | COI1 | [SJG1] | MUT0 | | | | |
| C | LER- | UPP1 | PET1 | GTT2 | UBA0 | YSS1 | NKK1 | MMB0 | AAA2 |
| | TFS2 | TKT3 | EBR1 | SPT1 | KAK0 | [TUC0] | KNY0 | TEN1 | LNP3 |
| | [HON1] | GUA1 | ETT0 | PMG0 | [PPT0] | MPO2 | GNA1 | [ACS0] | [TWA0] |
| D | YAK | NUR | HTY | ABG | | | | | |
| E | DOB | POD | MGD | LNN | HYB | BNG | (CNB ) | | |
| X | KIR | PEN | CTA | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | MAY 1983 | | | | | | 15/05 08:46 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | AAA1 | AQU3 | TKT2 | ASH3 | ABG2 | BNG1 | MPO0 | | |
| B | NOK0 | MGD0 | UPP1 | KGD0 | TYH0 | HYB0 | | | |
| C | YAK0<br>LVV2<br>LNP3 | ESK-<br>UBA2<br>MUT1 | WNG1<br>ODE2<br>ETT0 | PET1<br>NKK1<br>(PMG0) | NGK0<br>MMB0 | VAL0<br>EBR2 | GTT1<br>SPT1 | HAD-<br>KAK0 | KIV1<br>KNY0 |
| D | SOD<br>COI | NUR<br>HTY | LER<br>TEN | SVD<br>GNA | KNS | WIT | YSS | GCK | TFS |
| E | DOB | POD | LNN | MNK | HRB | [CNB ] | | | |
| X | KIR | PEN | (CTA ) | | | | | | |

| | JUNE 1983 | | | | | | 02/06 15:33 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | (POD2)<br>(MPO3) | SVD2 | ESK2 | (PET2) | (KGD2) | COI3 | (ASH3) | BNG1 | HUA3 |
| B | KIR-<br>WNG2<br>GCK3 | SOD2<br>WIT2<br>(AAA1) | DOB1<br>NGK1<br>AQU1 | (YAK2)<br>VAL1<br>TFS2 | NUR2<br>HAD1<br>EBR2 | LER2<br>KIV2<br>TUC0 | (MGD0)<br>LVV2<br>[ABG0] | LNN2<br>HRB2<br>(PPT0) | MNK0<br>(NKK1)<br>ACS1 |
| C | NOK2<br>(TKT3) | UPP1<br>SPT0 | KNS1<br>[KAK0] | GTT2<br>TEN2 | TYH0<br>[LNP3] | (UBA2)<br>[MUT0] | [YSS1]<br>[GUA0] | ODE2<br>[ETT0] | [MMB0]<br>[PMG0] |
| D | NEW | SJG | | | | | | | |
| E | FRD | [HYB ] | | | | | | | |
| X | PEN | [API ] | [CTA ] | TWA | | | | | |

| | JUNE 1983 | | | | | | 26/06 04:32 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD3 | WNG3 | PET3 | HRB3 | AQU1 | ASH3 | LNP3 | ABG1 | |
| B | YAK2<br>KAK3 | UPP2<br>HTY3 | MNK0<br>[TUC2] | NGK2<br>KNY3 | VAL2<br>HON1 | KIV2<br>[SJG0] | (NEW1)<br>[ACS0] | MMB3 | [FRD0] |
| C | NOK0<br>UBA0<br>ETT0 | SOD1<br>YSS2<br>(BNG1) | POD1<br>ODE2<br>PMG0 | LNN1<br>AAA2<br>(PPT0) | KNS2<br>TFS0<br>[TWA0] | ESK-<br>TKT2<br>EYR0 | GTT0<br>EBR1 | LVV2<br>(SPT0) | KGD0<br>MUT1 |
| D | KIR<br>GUA | DOB<br>API | NUR<br>GNA | LER<br>CNB | SVD | WIT1 | HAD | NKK | PEN |
| E | GCK | HYB | (MPO ) | | | | | | |
| X | TYH | CTA | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | JULY 1983 | | | | | | | 04/07 11:55 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | AAA2 | TKT3 | ASH3 | ABG0 | BNG1 | | | | |
| B | (PET2) | LVV3 | MPO2 | | | | | | |
| C | NOK0 | YAK0 | POD1 | LER0 | (MGD0) | UPP1 | SVD2 | ESK- | MNK0 |
| | WNG1 | WIT1 | VAL0 | KIV1 | HRB0 | UBA0 | (YSS1) | ODE2 | NKK- |
| | GCK1 | (MMB0) | AQU2 | TFS2 | FRD1 | PEN1 | [KAK0] | (TUC0) | (KNY0) |
| | TEN0 | (LNP3) | [HON0] | SJG1 | HYB1 | [MUT1] | ETT0 | [PMG0] | HUA0 |
| | [PPT0] | [GNA1] | ACS1 | | | | | | |
| D | SOD | DOB | NUR | LNN | KNS | NGK | HAD | KGD | EBR |
| | COI | SPT | | | | | | | |
| E | TYH | | | | | | | | |
| X | KIR | GTT | (TWA) | | | | | | |

| | AUGUST 1983 | | | | | | | 12/08 05:48 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | POD1 | | | | | | | | |
| B | NOK0 | MGD0 | KGD0 | UBA0 | AQU0 | LNP3 | ABG0 | | |
| C | SOD1 | UPP1 | SVD1 | ESK- | PET1 | WIT0 | NGK0 | VAL0 | GTT1 |
| | KIV1 | LVV2 | ODE2 | NKK- | AAA0 | TKT2 | [FRD0] | KNY0 | MUT0 |
| | ETT0 | MPO0 | | | | | | | |
| D | DOB | YAK | NUR | LER | LNN | KNS | MNK | WNG | HAD |
| | TYH | YSS | GCK | MMB | TFS | EBR | COI | SPT | KAK |
| | HTY | HYB | GUA | PMG | CTA | GNA | | | |
| E | KIR | HRB | PEN | ASH | BNG | CNB | | | |
| X | [ACS] | | | | | | | | |

| | AUGUST 1983 | | | | | | | 13/08 04:27 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD2 | KGD0 | AQU1 | ASH2 | | | | | |
| B | NOK0 | YAK1 | POD1 | KIV2 | LVV2 | ODE2 | MMB0 | TKT- | ABG0 |
| C | UPP1 | (ESK-) | WNG1 | WIT2 | NGK1 | (VAL0) | (NEW0) | TYH1 | YSS1 |
| | NKK- | TFS1 | (SPT0) | [FRD0] | KAK0 | HTY2 | KNY0 | LNP3 | PMG0 |
| | (PPT0) | GNA1 | [ACS0] | [TWA0] | | | | | |
| D | SOD | LER | HON | HYB | MUT1 | GUA | API | EYR | |
| E | KIR | DOB | NUR | MGD | LNN | KNS | MNK | PET | HRB |
| | UBA | GCK | AAA2 | (EBR) | ETT | (BNG) | CTA | MPO | CNB |
| X | GTT | PEN | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | AUGUST 1983 | | | | | | | 13/08 18:11 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | (AQU2) | [ASH3] | HUA2 | | | | | | |
| B | (NOK1) | (POD1) | (SVD1) | WNG2 | VAL0 | [KGD0] | NEW2 | [NKK-] | [TFS0] |
| | [TKT-] | COI1 | FRD2 | TUC2 | [ABG0] | | | | |
| C | (YAK0) | LER1 | (KNS2) | ESK- | (MNK0) | PET1 | WIT1 | NGK1 | (KIV1) |
| | (LVV2) | (TYH1) | (ODE2) | (GCK0) | (MMB0) | EBR0 | SPT0 | (PEN1) | [KAK0] |
| | [KNY0] | [LNP3] | HON1 | SJG1 | [MUT1] | [ETT0] | [BNG1] | [PMG0] | PPT0 |
| | [GNA1] | ACS0 | TWA0 | | | | | | |
| D | KIR | SOD | DOB | NUR | UPP | HAD | TEN | API | |
| E | MGD | (LNN) | (HRB) | [UBA] | [AAA2] | [HYB] | [MPO] | | |
| X | GTT | | | | | | | | |

| | SEPTEMBER 1983 | None |
|---|---|---|

| | OCTOBER 1983 | | | | | | | 05/10 15:01 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | AQU3 | COI3 | HUA2 | | | | | | |
| B | [MGD1] | WNG3 | HRB1 | SPT2 | MPO2 | ACS1 | TWA1 | | |
| C | SOD1 | [POD0] | (SVD1) | ESK0 | MNK1 | [PET0] | NGK0 | VAL0 | GTT1 |
| | HAD- | KIV1 | LVV2 | TYH1 | [UBA0] | ODE2 | GCK0 | EBR1 | FRD0 |
| | TEN1 | SJG2 | [ETT0] | | | | | | |
| D | KIR | DOB | NUR | LER | LNN | WIT | PEN | | |
| E | BNG | | | | | | | | |
| X | [NOK] | UPP | NEW | [AAA] | TUC | [MUT] | | | |

| | OCTOBER 1983 | | | | | | | 10/10 10:45 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | BNG1 | | | | | | | | |
| B | POD1 | [MGD1] | SVD2 | KIV2 | (UBA2) | ODE2 | AQU1 | ABG0 | [CTA2] |
| | MPO2 | ACS1 | TWA1 | | | | | | |
| C | NOK0 | SOD2 | (YAK0) | LNN1 | KNS2 | MNK0 | WNG1 | WIT1 | NGK1 |
| | VAL0 | GTT1 | HAD- | LVV2 | KGD0 | TYH1 | HRB0 | NKK1 | GCK0 |
| | [MMB0] | TFS2 | TKT2 | EBR1 | SPT1 | ASH1 | [KAK0] | [TUC0] | [KNY0] |
| | TEN1 | (LNP3) | [HON0] | HYB1 | [GUA1] | ETT0 | [PMG0] | (HUA1) | [PPT0] |
| | (GNA1) | [CNB2] | | | | | | | |
| D | KIR | DOB | NUR | ESK | COI | PEN | SJG | | |
| E | LER | | | | | | | | |
| X | UPP | [PET] | AAA | (MUT) | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | OCTOBER 1983 | | | | | | | | 15/10 04:25 C |
|---|---|---|---|---|---|---|---|---|---|
| A | (UPP1) | AAA2 | [FRD0] | [TUC0] | ABG1 | [HUA1] | | | |
| B | NOK1<br>(PPT0) | MGD0<br>MPO2 | SVD1<br>[ACS0] | (WNG0)<br>[TWA0] | PET2 | KGD0 | [NEW0] | (ODE2) | (AQU0) |
| C | YAK0<br>(LVV2)<br>HTY1 | KNS2<br>(TYH1)<br>KNY0 | [ESK-]<br>UBA0<br>LNP3 | (MNK0)<br>YSS1<br>ETT0 | (WIT0)<br>MMB0<br>(BNG1) | (NGK1)<br>TFS0<br>PMG1 | [VAL0]<br>TKT3 | (GTT1)<br>[SPT0] | (KIV1)<br>KAK0 |
| D | NKK | GUA | API | CTA | GNA | EYR | | | |
| E | (SOD) | POD | (HRB) | (PEN) | ASH | CNB2 | | | |
| X | (KIR) | HYB | MUT | | | | | | |

| | NOVEMBER 1983 | | | | | | | | 05/11 04:12 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | PET2 | | | | | | | | |
| C | [LER-]<br>HTY1 | MGD0<br>[TUC0] | SVD1<br>KNY0 | (KNS2)<br>MUT0 | UBA0<br>GUA1 | MMB0<br>PMG0 | TKT2<br>PPT0 | ASH1<br>MPO2 | KAK0 |
| D | NOK<br>ABG | YAK<br>HYB | POD<br>API | KGD<br>CTA | YSS<br>GNA | NKK<br>CNB | AAA<br>EYR | TFS | LNP |
| E | (BNG) | | | | | | | | |
| X | ETT | | | | | | | | |

| | NOVEMBER 1983 | | | | | | | | 08/11 01:52 C |
|---|---|---|---|---|---|---|---|---|---|
| A | (NOK1) | (KGD2) | [FRD1] | MUT2 | [HUA2] | (MPO1) | | | |
| B | [KIR-] | [GTT0] | UBA0 | [ODE2] | [AQU2] | CTA3 | GNA1 | [ACS0] | [TWA0] |
| C | PET0<br>MMB0<br>GUA1 | [NGK0]<br>[SPT0]<br>ETT0 | [VAL0]<br>KAK0<br>[BNG1] | [HAD-]<br>HTY2<br>EYR0 | [KIV1]<br>(TUC1) | [LVV2]<br>KNY0 | (NEW1)<br>LNP3 | YSS1<br>HON0 | [GCK0]<br>[SJG0] |
| D | ABG | HYB | API | | | | | | |
| E | [SOD]<br>[WIT] | [DOB]<br>[TYH] | YAK<br>[HRB] | (POD)<br>(NKK) | MGD<br>(AAA1) | [LNN]<br>[TFS] | (SVD)<br>(TKT) | [KNS]<br>(ASH) | [WNG]<br>PPT |
| X | [MNK] | PMG | CNB | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1983 (continued)

| | DECEMBER 1983 | | | | | | 07/12 00:44 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | (ABG0) | | | | | | | | |
| B | (NOK1) | PET1 | [KIV1] | [KGD1] | UBA0 | [TFS1] | [MPO1] | GNA1 | |
| C | [SOD1] | [ESK-] | [WIT1] | [NGK0] | [VAL0] | [GTT0] | [HAD-] | [LVV2] | (NEW0) |
| | [TYH1] | YSS1 | MMB0 | [AQU0] | [FRD0] | KAK2 | HTY2 | KNY2 | LNP3 |
| | HON0 | MUT1 | GUA0 | (ETT0) | [BNG1] | [HUA1] | (ACS0) | (TWA0) | EYR0 |
| D | API | | | | | | | | |
| E | [DOB ] | (YAK ) | (POD ) | MGD | [LNN ] | [SVD ] | [KNS ] | [HRB ] | [NKK ] |
| | [GCK ] | (AAA2) | [TKT ] | [PEN ] | [ASH ] | (HYB ) | PMG | PPT | CTA |
| | CNB | | | | | | | | |
| X | | | | | | | | | |

# SECTION 5

## 5.4. List of sfe 1984


- Solar-flare effects 1984
  - Summary list 205
  - Extended list 207
- Doubtful solar-flare effects 1984
  - Summary list 213
  - Extended list 215

## SOLAR-FLARE EFFECTS - Summary List 1984

| JANUARY 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 24/01 | 04:01 | C | 0 A | 8 B | 26 C | 6 D | 0 E | 4 X |

| FEBRUARY 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 25/02 | 03:10 | C | 6 A | 4 B | 14 C | 2 D | 2 E | 3 X |

| MARCH 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01/03 | 02:32 | C | 4 A | 3 B | 9 C | 8 D | 0 E | 2 X |
| 13/03 | 07:27 | C | 3 A | 6 B | 23 C | 11 D | 2 E | 3 X |
| 20/03 | 03:39 | C | 0 A | 6 B | 14 C | 9 D | 0 E | 1 X |
| 22/03 | 08:44 | C | 3 A | 10 B | 23 C | 5 D | 5 E | 1 X |
| 30/03 | 04:58 | C | 2 A | 11 B | 21 C | 6 D | 12 E | 1 X |

| APRIL 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 21/04 | 07:27 | C | 1 A | 9 B | 27 C | 10 D | 0 E | 1 X |
| 22/04 | 22:14 | C | 2 A | 9 B | 9 C | 2 D | 0 E | 1 X |
| 24/04 | 23:57 | C | 16 A | 3 B | 11 C | 1 D | 0 E | 6 X |
| 27/04 | 05:38 | C | 4 A | 15 B | 15 C | 2 D | 9 E | 2 X |

| MAY 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 15/05 | 04:45 | C | 0 A | 15 B | 18 C | 11 D | 0 E | 4 X |
| 19/05 | 21:51 | C | 16 A | 3 B | 21 C | 0 D | 2 E | 0 X |
| 20/05 | 22:31 | C | 16 A | 13 B | 7 C | 1 D | 14 E | 2 X |
| 31/05 | 11:26 | C | 9 A | 13 B | 21 C | 2 D | 1 E | 3 X |

| JUNE 1984 | None |
|---|---|

## SOLAR-FLARE EFFECTS - Summary List 1984 (continued)

| | |
|---|---|
| JULY 1984 | None |
| AUGUST 1984 | None |
| SEPTEMBER 1984 | None |
| OCTOBER 1984 | None |
| NOVEMBER 1984 | None |
| DECEMBER 1984 | None |

# SOLAR-FLARE EFFECTS (sfe) 1984

Times of commencements of solar-flare effects (sfe). The letter C indicates that the sfe is confirmed. The list of the observatories reporting a movement (A, B, C), or not (D, E, X, see text) are given for each event; normal brackets indicate stations in the twilight zone, square brackets stations in the nightside of earth.
The list of the collaborating 56 observatories is given below. They are identified by their IAGA three letter code, with alternative codes given in brackets (see list in Section 2, pages 29-36).

SOD YAK NUR MGD LNN BOX SVD KZM(KNS) KNG MNK WNG IRT(IRK) NGK VAL GTT KIV DOU NEW THY(TYH) HRB UBA NCK(NAG) YSS ODE NKK GCK MMB AAA AQU EBR COI TOL(SPT) FRD PEG(PEN) KAK TUC KNY QUE LNP HON ABG SJG HYB MUT GUA ETT BNG PMG API PPT LMM(MPO) GNA HER LAS(ACS) TRW(TWA) EYR

| | JANUARY 1984 | | | | | | 24/01 04:01 | | |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MMB1 | KNY1 | LNP2 | MUT2 | GUA1 | PPT1 | [ACS0] | [TWA0] | |
| C | [SOD0] (KIV2) ABG0 | (LNN2) [HRB1] [SJG0] | (BOX2) UBA2 HYB1 | (SVD1) YSS1 (BNG) | (KNS1) (ODE2) PMG0 | (MNK1) [GCK0] API0 | [WNG0] KAK1 MPO1 | [VAL0] [TUC0] HER0 | [GTT0] (HON0) |
| D | YAK | MGD | IRK0 | NKK | GNA | EYR | | | |
| E | | | | | | | | | |
| X | [KNG] | AAA | QUE | ETT | | | | | |

| | FEBRUARY 1984 | | | | | | 25/02 03:10 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | IRK2 | MUT2 | GUA2 | PMG3 | GNA3 | EYR2 | | | |
| B | MMB3 | KAK3 | KNY3 | LNP3 | | | | | |
| C | SVD2 HYB2 | (MNK0) ETT0 | [NGK0] API1 | UBA3 PPT1 | YSS2 (MPO2) | AAA1 | [AQU0] | HON1 | ABG1 |
| D | YAK | MGD | | | | | | | |
| E | (LNN) | (KNS) | | | | | | | |
| X | (BOX) | NKK | QUE | | | | | | |

| | MARCH 1984 | | | | | | 01/03 02:32 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD2 | UBA3 | PMG3 | GNA2 | | | | | |
| B | LNP3 | MUT0 | GUA3 | | | | | | |
| C | (LNN2) | IRK2 | YSS1 | MMB1 | KAK1 | KNY2 | HYB1 | ETT2 | [HER0] |
| D | YAK | NKK | AAA0 | HON | ABG | API0 | PPT | EYR | |
| E | | | | | | | | | |
| X | (BOX) | QUE | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | MARCH 1984 | | | | | | | | 13/03 07:27 C |
|---|---|---|---|---|---|---|---|---|---|
| A | IRK2 | ABG3 | MPO2 | | | | | | |
| B | MGD1 | LNN2 | SVD2 | KNS1 | LNP3 | ETT1 | | | |
| C | SOD1 | BOX0 | KNG1 | MNK1 | WNG1 | NGK1 | VAL0 | GTT1 | KIV1 |
| | [NEW0] | TYH0 | HRB1 | UBA3 | ODE2 | NKK | GCK0 | MMB0 | AAA0 |
| | AQU0 | PEN1 | KAK0 | KNY0 | HER0 | | | | |
| D | YAK | NUR | DOU | YSS | EBR | COI | SPT | GUA | BNG |
| | PMG | GNA | | | | | | | |
| E | HYB | MUT | | | | | | | |
| X | NAG | [TUC ] | QUE | | | | | | |

| | MARCH 1984 | | | | | | | | 20/03 03:39 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | SVD1 | (MNK1) | MMB2 | KAK2 | GUA3 | PMG1 | | | |
| C | MGD0 | BOX0 | IRK1 | (NGK0) | (GTT0) | UBA2 | YSS2 | KNY2 | LNP2 |
| | ABG1 | MUT0 | ETT0 | (MPO3) | EYR0 | | | | |
| D | YAK | KNS | NKK | AAA0 | HON | HYB | API0 | PPT | GNA |
| E | | | | | | | | | |
| X | QUE | | | | | | | | |

| | MARCH 1984 | | | | | | | | 22/03 08:44 C |
|---|---|---|---|---|---|---|---|---|---|
| A | LNN3 | KNG2 | HER0 | | | | | | |
| B | (MGD0) | BOX3 | SVD2 | WNG2 | NAG2 | ODE2 | NKK1 | GCK3 | AAA0 |
| | MPO2 | | | | | | | | |
| C | SOD1 | MNK1 | NGK1 | VAL0 | GTT0 | KIV1 | DOU1 | [NEW0] | TYH0 |
| | HRB1 | UBA0 | AQU1 | SPT0 | [FRD0] | PEN1 | (KAK0) | LNP1 | ABG1 |
| | HYB2 | MUT0 | ETT0 | (ACS0) | (TWA0) | | | | |
| D | NUR | EBR | COI | KNY | GNA | | | | |
| E | YAK | KNS | IRK | BNG | [PPT ] | | | | |
| X | QUE | | | | | | | | |

| | MARCH 1984 | | | | | | | | 30/03 04:58 C |
|---|---|---|---|---|---|---|---|---|---|
| A | IRK0 | BNG | | | | | | | |
| B | MGD1 | BOX1 | SVD1 | (WNG0) | NGK1 | (GTT0) | UBA1 | ODE2 | [FRD0] |
| | LNP3 | HER0 | | | | | | | |
| C | YAK1 | KNG1 | (VAL0) | (DOU1) | TYH0 | YSS1 | NKK1 | GCK0 | MMB0 |
| | AAA1 | AQU1 | (EBR0) | KAK0 | [TUC0] | KNY0 | ABG0 | [SJG0] | MUT1 |
| | PMG1 | [ACS0] | [TWA0] | | | | | | |
| D | NUR | NAG | GUA | API0 | GNA | EYR | | | |
| E | SOD | LNN | KNS | MNK | KIV | [NEW ] | HRB | PEN | HYB |
| | ETT | (PPT ) | MPO | | | | | | |
| X | QUE | | | | | | | | |

| | APRIL 1984 | | | | | | | | 21/04 07:27 C |
|---|---|---|---|---|---|---|---|---|---|
| A | HRB3 | | | | | | | | |
| B | YAK2 | MGD1 | SVD1 | WNG3 | IRK2 | YSS1 | NKK0 | AAA1 | HER0 |
| C | SOD1 | LNN2 | BOX2 | KNS2 | KNG0 | MNK1 | NGK1 | VAL0 | GTT1 |
| | KIV1 | UBA1 | NAG1 | ODE2 | GCK0 | MMB0 | AQU1 | EBR1 | KAK0 |
| | KNY0 | LNP2 | ABG0 | MUT1 | ETT0 | PMG1 | MPO1 | [ACS0] | [TWA0] |
| D | NUR | DOU | TYH | COI | SPT | PEN | HYB | GUA | BNG |
| | GNA | | | | | | | | |
| E | | | | | | | | | |
| X | QUE | | | | | | | | |

| | APRIL 1984 | | | | | | | | 22/04 22:14 C |
|---|---|---|---|---|---|---|---|---|---|
| A | PPT2 | EYR2 | | | | | | | |
| B | NEW2 | MMB1 | TUC3 | KNY1 | LNP3 | HON2 | MUT1 | GUA2 | PMG2 |
| C | YAK0 | MGD1 | UBA2 | YSS2 | FRD0 | KAK1 | SJG1 | [MPO0] | (TWA0) |
| D | IRK | API0 | | | | | | | |
| E | | | | | | | | | |
| X | [QUE ] | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | APRIL 1984 | | | | | | | 24/04 23:57 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD2<br>HON3 | IRK3<br>MUT1 | NEW3<br>GUA0 | YSS3<br>[BNG1] | MMB3<br>PMG1 | KAK3<br>PPT1 | TUC3<br>GNA0 | KNY3 | LNP3 |
| B | (SVD1) | [WNG0] | (FRD0) | | | | | | |
| C | (SOD0)<br>(HYB0) | (BOX1)<br>(ETT1) | (KNS1) | [KNG2] | [NGK1] | [GTT0] | [TYH0] | [ODE2] | [AQU0] |
| D | EYR | | | | | | | | |
| E | | | | | | | | | |
| X | YAK | UBA | (AAA ) | (QUE ) | API | [ACS ] | | | |

| | APRIL 1984 | | | | | | | 27/04 05:38 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | KNG3 | MNK1 | IRK3 | KIV2 | | | | | |
| B | BOX2<br>GCK0 | SVD2<br>MMB1 | WNG2<br>AQU1 | NGK0<br>KAK1 | GTT1<br>KNY1 | DOU2<br>ETT2 | NAG2 | ODE2 | NKK1 |
| C | VAL0<br>MUT0 | TYH2<br>GUA0 | YSS1<br>PMG1 | AAA2<br>MPO1 | EBR0<br>GNA1 | SPT0<br>(EYR0) | PEN1 | LNP2 | ABG0 |
| D | BNG | HER | | | | | | | |
| E | SOD | YAK | NUR | MGD2 | LNN | KNS | HRB | HYB | [PPT ] |
| X | UBA | QUE | | | | | | | |

| | MAY 1984 | | | | | | | 15/05 04:45 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | LNN1<br>NAG0 | BOX1<br>ODE2 | SVD1<br>MMB3 | KNG1<br>KAK3 | MNK2<br>KNY3 | WNG2<br>LNP3 | IRK1 | NGK1 | GTT0 |
| C | SOD1<br>(EBR0) | YAK1<br>(SPT0) | MGD0<br>[FRD1] | (VAL0)<br>HYB0 | UBA0<br>MUT0 | YSS1<br>GUA0 | GCK0<br>ETT0 | AAA0<br>BNG | AQU1<br>MPO2 |
| D | NUR<br>GNA | KNS<br>EYR | DOU | TYH | HRB | NKK | HON | ABG | API0 |
| E | | | | | | | | | |
| X | KIV | PEN | QUE | PMG | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | MAY 1984 | | | | | | 19/05 21:51 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK2<br>HON3 | MGD2<br>SJG3 | NEW3<br>MUT2 | MMB3<br>GUA3 | FRD3<br>PMG3 | KAK3<br>API3 | TUC3<br>PPT2 | KNY3 | LNP3 |
| B | (SOD2) | (WNG1) | EYR1 | | | | | | |
| C | (LNN2)<br>[TYH0]<br>[ETT0] | (BOX1)<br>UBA3<br>[BNG ] | (SVD1)<br>[NAG1]<br>[MPO1] | (KNS2)<br>YSS3 | (KNG1)<br>[ODE2] | (NGK0)<br>(AAA0) | (VAL0)<br>[AQU0] | (GTT0)<br>[PEN1] | [KIV2]<br>[QUE1] |
| D | | | | | | | | | |
| E | (MNK ) | IRK | | | | | | | |
| X | | | | | | | | | |

| | MAY 1984 | | | | | | 20/05 22:31 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | YAK2<br>HON1 | MGD2<br>MUT2 | (LNN2)<br>GUA0 | (BOX2)<br>PMG2 | (GTT0)<br>PPT2 | MMB3<br>[HER0] | KAK3<br>EYR0 | KNY3 | LNP3 |
| B | (SVD1)<br>SJG1 | (KNG1)<br>API2 | IRK1<br>[ACS0] | (NGK0)<br>(TWA0) | NEW1 | YSS3 | [GCK0] | [COI1] | [ABG0] |
| C | (KNS1) | (VAL0) | UBA2 | [AQU0] | [SPT1] | [QUE1] | [ETT0] | | |
| D | TUC | | | | | | | | |
| E | (SOD )<br>(AAA1) | (NUR )<br>FRD | (MNK )<br>[PEN ] | (WNG )<br>[HYB ] | [TYH ]<br>[MPO ] | [HRB ] | [NAG ] | [ODE ] | (NKK ) |
| X | [KIV ] | [BNG ] | | | | | | | |

| | MAY 1984 | | | | | | 31/05 11:26 C | | |
|---|---|---|---|---|---|---|---|---|---|
| A | KNG3 | WNG3 | KIV2 | HRB3 | NAG2 | ODE2 | (MUT1) | BNG | HER0 |
| B | SOD2<br>PEN2 | LNN1<br>(TUC1) | BOX3<br>QUE2 | SVD2<br>SJG0 | MNK2 | IRK1 | NGK1 | GTT3 | GCK3 |
| C | YAK0<br>AAA1<br>ETT0 | KNS1<br>AQU1<br>[PMG1] | VAL0<br>EBR1<br>MPO2 | DOU1<br>SPT1 | (NEW0)<br>FRD0 | TYH2<br>(KAK0) | (YSS1)<br>(KNY0) | NKK2<br>(LNP1) | (MMB0)<br>ABG0 |
| D | COI | HYB | | | | | | | |
| E | NUR | | | | | | | | |
| X | UBA | [GUA ] | ACS | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | |
|---|---|
| JUNE 1984 | None |
| JULY 1984 | None |
| AUGUST 1984 | None |
| SEPTEMBER 1984 | None |
| OCTOBER 1984 | None |
| NOVEMBER 1984 | None |
| DECEMBER 1984 | None |

# DOUBTFUL SOLAR-FLARE EFFECTS - Summary List 1984

| JANUARY 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 26/01 | 00:37 | C | 1 A | 14 B | 22 C | 3 D | 1 E | 2 X |

| FEBRUARY 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 03/02 | 11:20 | C | 3 A | 7 B | 22 C | 11 D | 1 E | 1 X |
| 10/02 | 03:15 | C | 2 A | 10 B | 14 C | 11 D | 0 E | 2 X |
| 11/02 | 02:32 | C | 6 A | 7 B | 12 C | 3 D | 21 E | 1 X |
| 26/02 | 12:41 | C | 10 A | 20 B | 14 C | 3 D | 5 E | 1 X |

| MARCH 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 13/03 | 05:20 | C | 0 A | 5 B | 20 C | 18 D | 1 E | 2 X |
| 30/03 | 03:14 | C | 1 A | 6 B | 23 C | 9 D | 11 E | 1 X |
| 30/03 | 05:54 | C | 2 A | 8 B | 21 C | 11 D | 10 E | 1 X |

| APRIL 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 04/04 | 09:39 | C | 6 A | 11 B | 13 C | 2 D | 16 E | 1 X |
| 06/04 | 02:00 | C | 1 A | 6 B | 18 C | 8 D | 4 E | 3 X |
| 07/04 | 02:48 | C | 6 A | 27 B | 14 C | 2 D | 2 E | 2 X |
| 22/04 | 22:51 | C | 0 A | 15 B | 0 C | 8 D | 0 E | 1 X |
| 23/04 | 05:12 | C | 0 A | 1 B | 9 C | 31 D | 0 E | 2 X |
| 24/04 | 03:18 | C | 3 A | 1 B | 7 C | 19 D | 0 E | 3 X |
| 27/04 | 13:50 | C | 1 A | 7 B | 18 C | 12 D | 6 E | 1 X |

| MAY 1984 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10/05 | 17:20 | C | 6 A | 14 B | 21 C | 1 D | 10 E | 1 X |
| 12/05 | 14:30 | C | 9 A | 18 B | 22 C | 3 D | 0 E | 1 X |
| 20/05 | 01:20 | C | 2 A | 9 B | 26 C | 5 D | 4 E | 2 X |
| 20/05 | 02:51 | C | 0 A | 6 B | 26 C | 10 D | 4 E | 3 X |
| 20/05 | 05:28 | C | 4 A | 9 B | 25 C | 6 D | 5 E | 1 X |
| 21/05 | 20:18 | C | 9 A | 14 B | 15 C | 2 D | 11 E | 1 X |

## DOUBTFUL SOLAR-FLARE EFFECTS - Summary List 1984 (continued)

| | |
|---|---|
| JUNE 1984 | None |
| JULY 1984 | None |
| AUGUST 1984 | None |
| SEPTEMBER 1984 | None |
| OCTOBER 1984 | None |
| NOVEMBER 1984 | None |
| DECEMBER 1984 | None |

# DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1984

| | JANUARY 1984 | | | | | | | | 26/01 00:37 C |
|---|---|---|---|---|---|---|---|---|---|
| A | [KIV2] | | | | | | | | |
| B | [BOX2] | [WNG0] | (IRK0) | MMB1 | [AQU0] | KAK1 | KNY2 | LNP2 | MUT2 |
| | PMG2 | PPT1 | [MPO2] | GNA1 | EYR1 | | | | |
| C | [SOD ] | [LNN2] | [SVD1] | [MNK0] | [NGK1] | [VAL0] | [GTT0] | [TYH2] | UBA0 |
| | [NAG0] | YSS1 | [ODE2] | [GCK0] | (AAA0) | [SPT0] | (HYB0) | (ETT0) | [BNG ] |
| | API0 | [HER0] | [ACS0] | (TWA0) | | | | | |
| D | MGD | HON | GUA | | | | | | |
| E | [HRB ] | | | | | | | | |
| X | YAK | [QUE ] | | | | | | | |

| | FEBRUARY 1984 | | | | | | | | 03/02 11:20 C |
|---|---|---|---|---|---|---|---|---|---|
| A | [MGD3] | LNN1 | (UBA0) | | | | | | |
| B | BOX2 | (IRK1) | NKK | [MUT1] | MPO2 | ACS1 | TWA1 | | |
| C | [YAK0] | NUR | SVD1 | KNG2 | MNK1 | WNG1 | NGK0 | VAL0 | GTT0 |
| | KIV1 | TYH1 | HRB1 | [YSS1] | ODE2 | SPT1 | PEN1 | [KAK0] | [LNP1] |
| | ABG0 | BNG | [PMG0] | HER0 | | | | | |
| D | SOD | DOU | NAG | GCK | AAA0 | AQU | EBR | COI | SJG |
| | HYB | ETT | | | | | | | |
| E | KNS | | | | | | | | |
| X | QUE | | | | | | | | |

| | FEBRUARY 1984 | | | | | | | | 10/02 03:15 C |
|---|---|---|---|---|---|---|---|---|---|
| A | AAA3 | MUT2 | | | | | | | |
| B | [SOD2] | MGD3 | (LNN2) | (KNS1) | IRK | UBA3 | YSS1 | LNP3 | PMG2 |
| | GNA1 | | | | | | | | |
| C | YAK1 | (BOX1) | (SVD2) | [MNK1] | [WNG0] | [NGK1] | [GTT0] | [TYH1] | [NAG2] |
| | (ODE2) | [GCK0] | [AQU0] | [TUC0] | (MPO0) | | | | |
| D | MMB | KAK | KNY | HON | ABG | HYB | GUA | ETT | API0 |
| | PPT | EYR | | | | | | | |
| E | | | | | | | | | |
| X | NKK | QUE | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | FEBRUARY 1984 | | | | | | | | 11/02 02:32 C |
|---|---|---|---|---|---|---|---|---|---|
| A | [BOX2] | (SVD0) | [WNG0] | ABG0 | PMG2 | EYR1 | | | |
| B | [NGK1] | YSS1 | [ODE2] | [EBR0] | [COI] | LNP3 | GNA1 | | |
| C | MGD2<br>MUT2 | (KNS1)<br>GUA0 | [VAL0]<br>(HER0) | UBA0 | MMB1 | [AQU0] | [SPT0] | KAK1 | KNY1 |
| D | HON | ETT | API0 | | | | | | |
| E | [SOD]<br>[TYH]<br>[BNG] | YAK<br>[HRB]<br>PPT | [LNN]<br>[NAG]<br>(MPO) | [KNG]<br>(NKK) | [MNK]<br>AAA1 | IRK0<br>[FRD] | [GTT]<br>[PEN] | [KIV]<br>[TUC] | (NEW)<br>HYB1 |
| X | QUE | | | | | | | | |

| | FEBRUARY 1984 | | | | | | | | 26/02 12:41 C |
|---|---|---|---|---|---|---|---|---|---|
| A | LNN2<br>COI2 | SVD0 | KNG3 | MNK2 | WNG3 | [IRK3] | VAL2 | KIV2 | NAG2 |
| B | SOD2<br>ODE2<br>[MUT1] | NUR2<br>GCK1<br>MPO2 | [MGD2]<br>[MMB0] | BOX2<br>AQU1 | NGK1<br>SPT1 | GTT3<br>FRD1 | DOU2<br>(TUC1) | HRB2<br>[KNY0] | [UBA2]<br>SJG1 |
| C | (NEW1)<br>[GUA0] | TYH3<br>BNG | [YSS1]<br>[PPT1] | (AAA2)<br>ACS0 | EBR1<br>TWA0 | PEN1 | [KAK0] | [LNP2] | [HON0] |
| D | ABG | ETT | HER | | | | | | |
| E | [YAK] | KNS | NKK | (HYB1) | [PMG] | | | | |
| X | QUE | | | | | | | | |

| | MARCH 1984 | | | | | | | | 13/03 05:20 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MGD1 | SVD2 | KNS1 | ETT1 | MPO2 | | | | |
| C | SOD1<br>[NEW0]<br>LNP1 | LNN2<br>TYH0<br>HYB1 | BOX2<br>UBA0 | KNG1<br>NAG2 | MNK0<br>ODE2 | (WNG0)<br>MMB1 | (NGK0)<br>AQU0 | (GTT1)<br>[FRD0] | KIV1<br>KNY1 |
| D | YAK<br>KAK | NUR<br>ABG | IRK<br>GUA | HRB<br>BNG | YSS<br>PMG | NKK<br>API0 | GCK<br>GNA | AAA0<br>HER | PEN<br>EYR |
| E | MUT | | | | | | | | |
| X | [TUC] | QUE | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | MARCH 1984 | | | | | | | | 30/03 03:14 C |
|---|---|---|---|---|---|---|---|---|---|
| A | IRK0 | | | | | | | | |
| B | MGD1 | BOX1 | SVD2 | [VAL0] | UBA0 | (NAG1) | | | |
| C | KNS0<br>AAA1 | (MNK1)<br>(AQU0) | (WNG0)<br>ABG0 | (NGK0)<br>MUT1 | (GTT0)<br>ETT0 | (TYH1) | YSS0 | (ODE2) | NKK1 |
| D | LNP | HON | HYB | GUA | PMG | API0 | PPT | GNA | EYR |
| E | (SOD)<br>[BNG] | YAK<br>(MPO) | (LNN) | (NEW) | (HRB) | MMB | (PEN) | KAK | KNY |
| X | QUE | | | | | | | | |

| | MARCH 1984 | | | | | | | | 30/03 05:54 C |
|---|---|---|---|---|---|---|---|---|---|
| A | IRK0 | EYR1 | | | | | | | |
| B | MGD1 | BOX1 | SVD2 | WNG1 | UBA1 | NAG0 | [FRD0] | ETT0 | |
| C | KNG1<br>AAA1<br>PMG1 | MNK0<br>AQU0<br>[ACS0] | NGK0<br>(SPT0)<br>[TWA0] | (VAL0)<br>[TUC0] | GTT0<br>LNP2 | YSS0<br>(HON0) | ODE2<br>ABG0 | NKK1<br>MUT0 | GCK0<br>GUA0 |
| D | YAK<br>GNA | NUR<br>HER | KIV | DOU | TYH | MMB | EBR | KNY | BNG |
| E | SOD<br>MPO | LNN | KNS | [NEW] | HRB | PEN | KAK | HYB | [PPT] |
| X | QUE | | | | | | | | |

| | APRIL 1984 | | | | | | | | 04/04 09:39 C |
|---|---|---|---|---|---|---|---|---|---|
| A | LNN | HRB3 | UBA1 | AAA3 | [PMG1] | [EYR0] | | | |
| B | NUR3<br>ODE2 | (MGD1)<br>HER0 | BOX1 | MNK1 | IRK1 | NGK1 | VAL1 | GTT0 | DOU1 |
| C | KNG2<br>[API0] | TYH1<br>GNA1 | (YSS2)<br>(ACS0) | AQU1<br>(TWA0) | SPT0 | LNP1 | ABG0 | MUT1 | ETT0 |
| D | EBR | COI | | | | | | | |
| E | SOD<br>(FRD) | YAK<br>PEN | SVD<br>(KAK) | KNS<br>HYB | WNG<br>BNG | KIV<br>[PPT] | NAG<br>MPO | NKK | GCK |
| X | QUE | | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | APRIL 1984 | | | | | | | | 06/04 02:00 C |
|---|---|---|---|---|---|---|---|---|---|
| A | [FRD0] | | | | | | | | |
| B | (BOX0) | [WNG0] | [GTT0] | NEW0 | ETT0 | EYR1 | | | |
| C | MGD1 | SVD0 | IRK1 | [NGK0] | [VAL0] | MMB0 | AAA0 | KAK0 | (TUC0) |
| | KNY0 | LNP2 | [SJG0] | MUT1 | GUA0 | PMG1 | [MPO1] | [ACS0] | [TWA0] |
| D | YAK | YSS | NKK | HON | ABG | HYB | API0 | GNA | |
| E | (SOD ) | (KNS ) | [BNG ] | PPT | | | | | |
| X | (MNK ) | UBA | QUE | | | | | | |

| | APRIL 1984 | | | | | | | | 07/04 02:48 C |
|---|---|---|---|---|---|---|---|---|---|
| A | MGD2 | (KNG3) | IRK3 | (NAG1) | AAA3 | PMG2 | | | |
| B | (SOD2) | YAK2 | (LNN1) | BOX1 | SVD1 | (MNK0) | (NGK0) | (GTT0) | [DOU1] |
| | UBA3 | (ODE2) | (GCK0) | MMB1 | [AQU1] | [COI1] | [SPT1] | KAK1 | KNY1 |
| | LNP3 | ABG0 | HYB1 | GUA1 | ETT2 | PPT1 | [HER0] | [ACS0] | [TWA0] |
| C | (NUR1) | (WNG0) | [VAL0] | (KIV1) | (TYH1) | NKK0 | (PEN1) | (TUC0) | HON2 |
| | [SJG0] | MUT1 | [BNG ] | API0 | EYR0 | | | | |
| D | YSS | GNA | | | | | | | |
| E | KNS | (HRB ) | | | | | | | |
| X | QUE | (MPO ) | | | | | | | |

| | APRIL 1984 | | | | | | | | 22/04 22:51 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | YAK1 | MMB1 | KNY1 | MUT0 | [MPO0] | EYR1 | C | MGD1 | (KNS1) |
| | IRK1 | UBA0 | YSS1 | KAK1 | LNP3 | PMG1 | | | |
| D | NEW | FRD | TUC | HON | GUA | API0 | PPT | GNA | |
| E | | | | | | | | | |
| X | [QUE ] | | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | APRIL 1984 | | | | | | | 23/04 05:12 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MUT1 | | | | | | | | |
| C | SVD1 | IRK1 | UBA0 | PEN0 | LNP2 | HYB0 | GUA2 | ETT1 | MPO2 |
| D | SOD | YAK | NUR | MGD | LNN | BOX | KNS | KNG | MNK |
| | WNG | NGK | GTT | KIV | DOU | TYH | HRB | NAG | YSS |
| | ODE | NKK | GCK | MMB | AQU | KAK | KNY | ABG | BNG |
| | PMG | API0 | GNA | EYR | | | | | |
| E | | | | | | | | | |
| X | AAA | QUE | | | | | | | |

| | APRIL 1984 | | | | | | | 24/04 03:18 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | MMB3 | KAK3 | KNY3 | | | | | | |
| B | LNP3 | | | | | | | | |
| C | MGD1 | BOX0 | SVD1 | KNS0 | IRK1 | (NGK0) | ETT0 | | |
| D | SOD | YAK | NUR | LNN | MNK | KIV | UBA | YSS | ODE |
| | NKK | HON | ABG | HYB | GUA | PMG | API0 | PPT | GNA |
| | EYR | | | | | | | | |
| E | | | | | | | | | |
| X | AAA | QUE | MUT | | | | | | |

| | APRIL 1984 | | | | | | | 27/04 13:50 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | WNG3 | | | | | | | | |
| B | BOX3 | SVD1 | MNK0 | (IRK2) | NGK0 | (AAA0) | MPO2 | | |
| C | SOD1 | KNG1 | VAL0 | GTT0 | KIV1 | NEW0 | HRB1 | (UBA2) | NAG1 |
| | ODE2 | AQU0 | SPT0 | FRD0 | [LNP2] | [MUT1] | (ETT0) | [PMG1] | HER0 |
| D | NUR | DOU | TYH | NKK | GCK | EBR | COI | PEN | TUC |
| | SJG | ACS | TWA | | | | | | |
| E | (YAK) | (MGD2) | LNN | KNS | (HYB) | BNG | | | |
| X | QUE | | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | MAY 1984 | | | | | | | | 10/05 17:20 C |
|---|---|---|---|---|---|---|---|---|---|
| A | KNG3 | WNG3 | VAL1 | KIV2 | NAG1 | FRD2 | | | |
| B | (MGD0)<br>EBR1 | BOX1<br>COI1 | (SVD2)<br>[ABG0] | MNK1<br>SJG2 | NGK1<br>ACS0 | GTT0 | [UBA1] | (ODE2) | AQU1 |
| C | SOD1<br>[KAK0]<br>[PMG1] | NUR<br>TUC0<br>(HER0) | DOU1<br>[KNY0]<br>TWA0 | NEW0<br>[LNP2] | TYH0<br>HON0 | (YSS1)<br>[MUT1] | GCK0<br>[GUA0] | (MMB0)<br>[ETT0] | SPT1<br>(BNG) |
| D | PEN | | | | | | | | |
| E | (YAK)<br>[MPO] | LNN | (KNS) | [IRK] | HRB | (NKK) | [AAA1] | [HYB] | PPT |
| X | [QUE] | | | | | | | | |

| | MAY 1984 | | | | | | | | 12/05 14:30 C |
|---|---|---|---|---|---|---|---|---|---|
| A | SVD2 | KNG3 | MNK2 | WNG2 | (IRK3) | KIV2 | NAG3 | FRD1 | [EYR0] |
| B | SOD2<br>ODE2 | (YAK2)<br>[MMB0] | NUR2<br>AQU2 | LNN1<br>[KAK0] | BOX2<br>[KNY0] | NGK1<br>[HON1] | VAL1<br>[MUT0] | GTT2<br>[PMG1] | HRB2<br>ACS1 |
| C | (MGD1)<br>(AAA1)<br>MPO1 | KNS1<br>EBR2<br>[GNA1] | DOU1<br>PEN0<br>HER0 | NEW0<br>TUC0<br>TWA1 | TYH3<br>[LNP0] | (UBA3)<br>SJG0 | [YSS1]<br>[GUA0] | NKK1<br>[ETT0] | GCK0<br>[PPT1] |
| D | COI | SPT | BNG | | | | | | |
| E | | | | | | | | | |
| X | (QUE) | | | | | | | | |

| | MAY 1984 | | | | | | | | 20/05 01:20 C |
|---|---|---|---|---|---|---|---|---|---|
| A | IRK3 | AAA2 | | | | | | | |
| B | MGD0 | BOX2 | (WNG0) | (GTT0) | LNP3 | PPT1 | [MPO1] | [HER0] | EYR1 |
| C | YAK1<br>YSS1<br>QUE1 | SVD1<br>(ODE2)<br>MUT1 | (KNG2)<br>NKK1<br>ETT0 | (NGK0)<br>MMB1<br>[BNG] | (VAL0)<br>[AQU0]<br>PMG1 | (KIV1)<br>[SPT0]<br>GNA1 | NEW1<br>KAK1<br>[ACS0] | (TYH0)<br>TUC0<br>[TWA0] | UBA1<br>KNY1 |
| D | HON | ABG | HYB | GUA | API0 | | | | |
| E | SOD | (LNN) | KNS | (NAG) | | | | | |
| X | (MNK) | [PEN] | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| MAY 1984 | | | | | | | | | 20/05 02:51 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | MGD0 | BOX1 | (WNG0) | RK1 | (GTT0) | LNP3 | | | |
| C | YAK0 | SVD0 | KNG3 | (NGK0) | (VAL0) | KIV2 | (DOU1) | (TYH0) | UBA0 |
| | (NAG1) | ODE2 | MMB1 | (AQU0) | (EBR0) | [SPT0] | [FRD1] | KAK1 | KNY1 |
| | HYB0 | MUT1 | ETT0 | PMG1 | [MPO2] | [ACS0] | [TWA0] | EYR1 | |
| D | NUR | NEW | YSS | NKK | HON | ABG | GUA | API0 | PPT |
| | GNA | | | | | | | | |
| E | SOD | LNN | KNS | (PEN ) | | | | | |
| X | MNK | AAA | QUE | | | | | | |

| MAY 1984 | | | | | | | | | 20/05 05:28 C |
|---|---|---|---|---|---|---|---|---|---|
| A | BOX1 | KNG3 | IRK3 | HYB1 | | | | | |
| B | MGD0 | SVD2 | WNG2 | NGK0 | GTT0 | NAG1 | LNP3 | ABG0 | MPO2 |
| C | SOD1 | YAK0 | NUR | VAL0 | DOU1 | TYH0 | UBA1 | YSS0 | ODE2 |
| | GCK0 | MMB1 | AAA1 | AQU1 | SPT1 | KAK1 | [TUC0] | KNY1 | QUE1 |
| | MUT1 | PMG1 | [PPT0] | GNA1 | (HER0) | [ACS0] | [TWA0] | | |
| D | NKK | EBR | COI | PEN | GUA | BNG | | | |
| E | LNN | KNS | KIV | HRB | ETT | | | | |
| X | MNK | | | | | | | | |

| MAY 1984 | | | | | | | | | 21/05 20:18 C |
|---|---|---|---|---|---|---|---|---|---|
| A | (BOX1) | (IRK3) | VAL0 | (GTT0) | (NAG0) | FRD1 | GUA1 | PPT2 | [HER0] |
| B | MGD1 | (LNN2) | (SVD1) | (KNG1) | (NGK0) | (UBA0) | [ODE2] | MMB1 | (EBR0) |
| | KAK1 | (KNY1) | (MUT0) | API0 | [MPO1] | | | | |
| C | (KIV1) | (TYH1) | YSS0 | (GCK0) | (AQU1) | (SPT0) | TUC0 | [QUE1] | (LNP0) |
| | HON1 | [ABG0] | (PMG1) | ACS0 | TWA0 | EYR0 | | | |
| D | NEW | SJG | | | | | | | |
| E | SOD | YAK | (NUR ) | (KNS ) | (MNK ) | (WNG ) | (HRB ) | [NKK ] | [AAA1] |
| | [PEN ] | [HYB ] | | | | | | | |
| X | [ETT ] | | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1984 (continued)

| | |
|---|---|
| JUNE 1984 | None |
| JULY 1984 | None |
| AUGUST 1984 | None |
| SEPTEMBER 1984 | None |
| OCTOBER 1984 | None |
| NOVEMBER 1984 | None |
| DECEMBER 1984 | None |

# SECTION 5

## 5.5. List of sfe 1987


- Solar-flare effects 1987
  - Summary list 225
  - Extended list 227
- Doubtful solar-flare effects 1987
  - Summary list 232
  - Extended list 234

# SOLAR-FLARE EFFECTS - Summary List 1987

| JANUARY 1987 | None |
|---|---|

| FEBRUARY 1987 | None |
|---|---|

| MARCH 1987 | None |
|---|---|

| APRIL 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 06/04 | 11:04 | | 2 A | 12 B | 30 C | 8 D | 0 E | 3X |
| 15/04 | 07:33 | C | 1 A | 3 B | 23 C | 23 D | 1 E | 1X |

| MAY 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 21/05 | 03:15 | C | 0 A | 2 B | 19 C | 24 D | 1 E | 0X |
| 25/05 | 03:42 | | 6 A | 14 B | 19 C | 3 D | 18 E | 1X |

| JUNE 1987 | None |
|---|---|

| JULY 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 24/06 | 09:55 | C | 1 A | 9 B | 30 C | 9 D | 1 E | 1X |
| 27/07 | 18:10 | C | 3 A | 6 B | 24 C | 9 D | 0 E | 1X |

| AUGUST 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 08/08 | 03:34 | C | 2 A | 9 B | 20 C | 13 D | 1 E | 1X |
| 09/08 | 13:53 | C | 4 A | 12 B | 29 C | 4 D | 1 E | 1X |

## SOLAR-FLARE EFFECTS - Summary List 1987 (continued)

| SEPTEMBER 1987 | None |
|---|---|

| OCTOBER 1987 | None |
|---|---|

| NOVEMBER 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 05/11 | 04:56 | C | 5 A | 6 B | 11 C | 10 D | 1 E | 1 X |
| 18/11 | 03:15 | C | 2 A | 6 B | 13 C | 8 D | 1 E | 1 X |
| 20/11 | 04:14 | C | 0 A | 9 B | 35 C | 6 D | 1 E | 0 X |

| DECEMBER 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 14/12 | 04:22 | C | 1 A | 5 B | 18 C | 5 D | 1 E | 0 X |

# SOLAR-FLARE EFFECTS (sfe) 1987

Times of commencements of solar-flare effects (sfe). The letter C indicates that the sfe is confirmed. The list of the observatories reporting a movement (A, B, C), or not (D, E, X, see text) are given for each event; normal brackets indicate stations in the twilight zone, square brackets stations in the nightside of earth.
The list of the collaborating 64 observatories is given below. They are identified by their IAGA three letter code, with alternative codes given in brackets (see list in Section 2, pages 29-36).

NOK KIR YAK NUR MGD LER LNN SVD(SV3) KZN BFE ESK MEA WNG PET IRT NGK VAL GTT HAD KIV KGD BDV VIC HRB YSS THY ODE OTT GCK MMB AAA AQU TFS TKT EBR COI SPT FRD PEN KAK HTY TUC KNY QUE SZT(TEN) LNP HON ABG SJG HYB GUA ETT PMG API PPT TAN LMM(MPO) GNA HER LAS(ACS) CAN(CNB) TRW(TWA) EYR AIA

| JANUARY 1987 | None |
|---|---|

| FEBRUARY 1987 | None |
|---|---|

| MARCH 1987 | None |
|---|---|

| APRIL 1987 | | | | | | | 06/04 | 11:04 | |
|---|---|---|---|---|---|---|---|---|---|
| A | HRB2 | COI3 | | | | | | | |
| B | KIR-<br>TFS2 | NUR1<br>FRD0 | KZN2<br>(LNP1) | ESK1 | (MEA2) | VAL1 | KIV1 | ODE2 | AQU2 |
| C | NOK2<br>NGK1<br>AAA0<br>(GNA1) | (YAK3)<br>GTT0<br>TKT1<br>HER0 | LER1<br>HAD1<br>EBR0<br>(AIA-) | LNN-<br>BDV0<br>SPT1 | SV31<br>[YSS0]<br>[KAK0] | BFE-<br>THY0<br>[KNY0] | WNG1<br>OTT1<br>QUE1 | [PET1]<br>GCK0<br>ETT0 | IRT1<br>[MMB0]<br>MPO0 |
| D | KGD | TEN | ABG | SJG | HYB | TAN | ACS | TWA | |
| E | | | | | | | | | |
| X | [VIC ] | PEN | [CNB ] | | | | | | |

| | APRIL 1987 | | | | | | | 15/04 | 07:33 C |
|---|---|---|---|---|---|---|---|---|---|
| A | LNP3 | | | | | | | | |
| B | TFS2 | ETT3 | MPO2 | | | | | | |
| C | YAK2 | LNN- | SV32 | KZN2 | GTT2 | HAD0 | KIV2 | KGD0 | YSS0 |
| | ODE2 | GCK0 | MMB3 | AAA0 | AQU0 | PEN2 | KAK1 | HTY3 | KNY3 |
| | QUE1 | ABG2 | HYB2 | GUA2 | GNA1 | | | | |
| D | NOK | KIR | NUR | MGD | LER | ESK | WNG | PET | IRT |
| | NGK | VAL | BDV | HRB | THY | TKT | EBR | COI | SPT |
| | TEN | PMG | TAN | HER | CNB | | | | |
| E | BFE | | | | | | | | |
| X | [VIC ] | | | | | | | | |

| | MAY 1987 | | | | | | | 21/05 | 03:15 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | PET2 | (TAN2) | | | | | | | |
| C | NOK1 | YAK1 | MGD0 | MEA1 | (WNG0) | IRT0 | (GTT0) | KIV1 | [OTT1] |
| | MMB3 | AAA0 | (AQU1) | [COI1] | (PEN0) | KAK3 | HTY3 | KNY3 | LNP3 |
| | ETT0 | | | | | | | | |
| D | KIR | NUR | LNN | SV3 | KZN | KGD | VIC | HRB | YSS |
| | ODE | GCK | TFS | TKT | QUE | HON | ABG | HYB | GUA |
| | PMG | API | PPT | GNA | CNB | EYR | | | |
| E | BFE | | | | | | | | |
| X | | | | | | | | | |

| | MAY 1987 | | | | | | | 25/05 | 03:42 |
|---|---|---|---|---|---|---|---|---|---|
| A | PET2 | NGK1 | TFS1 | TKT3 | LNP3 | ABG3 | | | |
| B | NOK3 | KIR- | YAK1 | LER0 | SV31 | IRT0 | GTT0 | (HAD1) | KGD0 |
| | [OTT1] | AAA1 | GUA2 | TAN2 | [ACS0] | | | | |
| C | MGD0 | LNN- | (VAL0) | KIV1 | VIC2 | YSS1 | ODE2 | MMB0 | (AQU1) |
| | (COI2) | SPT0) | KAK0 | HTY1 | KNY0 | HON2 | GNA1 | [HER0] | CNB2 |
| | [TWA0] | | | | | | | | |
| D | BDV | PMG | API | | | | | | |
| E | NUR | KZN | BFE | (ESK ) | MEA | WNG | HRB | THY | GCK |
| | (EBR ) | [FRD ] | PEN | HYB | ETT | (PPT ) | (MPO ) | EYR | [AIA ] |
| X | QUE | | | | | | | | |

| | JUNE 1987 | None |
|---|---|---|

## SOLAR-FLARE EFFECTS (sfe) 1987 (continued)

| | JULY 1987 | | | | | | | 24/06 | 09:55 C |
|---|---|---|---|---|---|---|---|---|---|
| A | ABG2 | | | | | | | | |
| B | KIR- | SV32 | KZN2 | WNG3 | ODE2 | AAA2 | TFS3 | QUE1 | LNP2 |
| C | NOK3 | YAK1 | NUR2 | MGD1 | LER1 | LNN- | ESK0 | (MEA1) | IRT0 |
| | NGK1 | VAL0 | GTT2 | HAD1 | KIV1 | KGD0 | HRB1 | YSS0 | AQU0 |
| | TKT2 | EBR0 | COI1 | SPT1 | (FRD1) | [TUC0] | (SJG0) | HYB2 | ETT0 |
| | MPO2 | (GNA1) | [AIA-] | | | | | | |
| D | BDV | THY | OTT | GCK | PEN | KNY | TEN | TAN | HER |
| E | BFE | | | | | | | | |
| X | (VIC) | | | | | | | | |

| | JULY 1987 | | | | | | | 27/07 | 18:10 C |
|---|---|---|---|---|---|---|---|---|---|
| A | HRB3 | COI2 | FRD3 | | | | | | |
| B | KIR- | WNG3 | OTT2 | TUC3 | HON2 | SJG2 | | | |
| C | (NOK1) | (YAK0) | NUR1 | BFE2 | ESK0 | MEA1 | PET1 | (IRT0) | NGK0 |
| | VAL0 | GTT2 | HAD1 | (KIV1) | [KGD0] | BDV2 | (ODE2) | (GCK0) | [AAA1] |
| | AQU0 | EBR0 | SPT1 | (PEN1) | [GUA0] | ACS0 | | | |
| D | MGD | LER | LNN | THY | TEN | API | PPT | TWA | AIA |
| E | | | | | | | | | |
| X | VIC | | | | | | | | |

| | AUGUST 1987 | | | | | | | 08/08 | 03:34 C |
|---|---|---|---|---|---|---|---|---|---|
| A | LNP3 | EYR2 | | | | | | | |
| B | PET2 | IRT0 | MMB3 | TFS1 | KAK3 | HTY3 | KNY3 | ABG2 | GUA2 |
| C | YAK3 | MGD- | (LER0) | SV32 | KZN2 | (ESK0) | (WNG0) | (GTT0) | KIV1 |
| | (VIC0) | YSS1 | ODE2 | AAA2 | HYB2 | ETT0 | PMG3 | API1 | TAN0 |
| | GNA1 | [AIA-] | | | | | | | |
| D | NOK | KIR | NUR | LNN | BFE | KGD | HRB | GCK | TKT |
| | PEN | HON | PPT | CNB | | | | | |
| E | [OTT] | | | | | | | | |
| X | QUE | | | | | | | | |

## SOLAR-FLARE EFFECTS (sfe) 1987 (continued)

| | AUGUST 1987 | | | | | | 09/08 | 13:53 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | NOK1 | KIR- | (YAK2) | COI3 | | | | | |
| B | (MGD0) AAA0 | SV32 TFS1 | MEA1 EBR0 | WNG3 | [PET1] | (IRT0) | VAL1 | HAD1 | HRB1 |
| C | NUR1 KGD0 FRD2 MPO0 | LER1 BDV3 PEN2 ACS0 | LNN- [YSS1] TUC0 | KZN2 THY0 QUE1 | BFE- ODE2 [LNP0] | ESK1 GCK0 (ABG1 | NGK0 AQU1 SJG2 | GTT1 TKT1 (ETT0) | KIV1 SPT1 TAN1 |
| D | VIC | HER | TWA | AIA | | | | | |
| E | OTT | | | | | | | | |
| X | TEN | | | | | | | | |

| | SEPTEMBER 1987 | None |
|---|---|---|

| | OCTOBER 1987 | None |
|---|---|---|

| | NOVEMBER 1987 | | | | | | 05/11 | 04:56 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | MMB3 | KAK3 | KNY3 | LNP3 | ETT3 | | | | |
| B | [MEA2] | IRT0 | TFS1 | HTY3 | ABG2 | GNA1 | | | |
| C | NOK0 TAN1 | YAK2 MPO1 | MGD0 | (NGK0) | YSS0 | AAA0 | QUE1 | PMG0 | API1 |
| D | SV3 EYR | KZN | PET | KGD | TKT | HYB | GUA | HER | CNB |
| E | (BFE ) | | | | | | | | |
| X | [TEN ] | | | | | | | | |

| | NOVEMBER 1987 | | | | | | 18/11 | 03:15 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | GUA2 | EYR3 | | | | | | | |
| B | [KIR-] | IRT1 | (TFS1) | LNP3 | ABG1 | PMG3 | | | |
| C | (NOK0) HYB2 | YAK2 API1 | PET2 TAN0 | YSS1 GNA1 | MMB3 | TKT2 | KAK1 | HTY2 | KNY1 |
| D | MGD | KGD | QUE | HON | ETT | PPT | MPO | CNB | |
| E | [BFE ] | | | | | | | | |
| X | AAA | | | | | | | | |

| | NOVEMBER 1987 | | | | | | 20/11 | 04:14 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | IRT0 | [HAD1] | [OTT1] | MMB3 | KAK1 | KNY1 | LNP3 | ABG2 | TAN2 |
| C | (NOK1) | [KIR-] | YAK2 | (NUR1) | MGD1 | [LER0] | (LNN-) | (SV32) | (KZN2) |
| | [MEA0] | WNG0] | PET1 | [NGK0] | [VAL0] | [GTT0] | (KIV1) | KGD0 | [HRB0] |
| | YSS1 | (ODE2) | (GCK0) | AAA0 | [AQU0] | [SPT0] | [FRD0] | (PEN0) | HTY1 |
| | [TUC0] | QUE1 | HYB0 | ETT0 | PMG0 | MPO1 | GNA1 | EYR0 | |
| D | TKT | GUA | API | PPT | HER | CNB | | | |
| E | [BFE ] | | | | | | | | |
| X | | | | | | | | | |

| | DECEMBER 1987 | | | | | | 14/12 | 04:22 C | |
|---|---|---|---|---|---|---|---|---|---|
| A | EYR3 | | | | | | | | |
| B | IRT0 | LNP2 | ABG2 | MPO2 | GNA2 | | | | |
| C | YAK2 | MGD0 | KGD0 | YSS1 | (ODE2) | MMB3 | AAA0 | KAK3 | HTY3 |
| | KNY3 | QUE1 | HYB1 | GUA1 | ETT0 | PMG0 | TAN0 | CNB1 | (AIA-) |
| D | PET | TKT | API | PPT | HER | | | | |
| E | [BFE ] | | | | | | | | |
| X | | | | | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS - Summary List 1987

| JANUARY 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 21/01 | 13:29 | | 2 A | 11 B | 32 C | 5 D | 2 E | 2 X |

| FEBRUARY 1987 | None |
|---|---|

| MARCH 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 26/03 | 10:43 | | 22 A | 21 B | 13 C | 5 D | 0 E | 2 X |

| APRIL 1987 | None |
|---|---|

| MAY 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 28/05 | 10:51 | | 6 A | 8 B | 13 C | 16 D | 1 E | 2 X |

| JUNE 1987 | None |
|---|---|

| JULY 1987 | None |
|---|---|

| AUGUST 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 07/08 | 13:00 | C | 1 A | 4 B | 23 C | 18 D | 1 E | 4 X |

| SEPTEMBER 1987 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 08/09 | 07:36 | | 9 A | 15 B | 27 C | 5 D | 4 E | 2 X |
| 21/09 | 01:57 | C | 0 A | 4 B | 28 C | 7 D | 2 E | 0 X |

## DOUBTFUL SOLAR-FLARE EFFECTS - Summary List 1987 (continued)

| | |
|---|---|
| OCTOBER 1987 | none |

| | |
|---|---|
| NOVEMBER 1987 | none |

| | |
|---|---|
| DECEMBER 1987 | none |

# DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1987

| JANUARY 1987 | | | | | | | | 21/01 | 13:29 |
|---|---|---|---|---|---|---|---|---|---|
| A | (KIR-) | [YAK2] | | | | | | | |
| B | [NOK1] | NUR2 | (SV32) | (MEA1) | WNG2 | [PET2] | [IRT0] | VAL0 | [KGD1] |
| | [AAA1] | (TKT0) | | | | | | | |
| C | [MGD0] | LER0 | (LNN-) | BFE1 | ESK1 | NGK0 | GTT0 | HAD1 | BDV0 |
| | HRB1 | [YSS0] | THY2 | ODE2 | OTT1 | GCK0 | [MMB0] | AQU1 | EBR0 |
| | COI2 | FRD0 | [KAK0] | [HTY0] | (TUC2) | [KNY0] | TEN1 | [LNP1] | [HON1] |
| | (ABG1) | SJG0 | MPO0 | ACS0 | AIA- | | | | |
| D | TFS | SPT | TAN | HER | TWA | | | | |
| E | (KZN) | PEN | | | | | | | |
| X | KIV | [VIC] | | | | | | | |

| FEBRUARY 1987 | None |
|---|---|

| MARCH 1987 | | | | | | | | 26/03 | 10:43 |
|---|---|---|---|---|---|---|---|---|---|
| A | NOK2 | KIR- | NUR2 | SV33 | KZN1 | ESK2 | [MEA2] | WNG2 | NGK1 |
| | KIV2 | BDV2 | HRB3 | ODE2 | AQU2 | EBR2 | COI3 | PEN3 | ABG3 |
| | [PMG0] | MPO2 | HER1 | [EYR1] | | | | | |
| B | (YAK2) | LER1 | LNN- | BFE2 | [PET2] | IRT2 | VAL0 | GTT2 | HAD1 |
| | (OTT1) | GCK1 | [MMB0] | TFS3 | (FRD1) | [KAK0] | (KNY0) | TEN1 | (LNP2) |
| | [HON0] | [GUA0] | AIA- | | | | | | |
| C | (MGD2) | KGD0 | [YSS2] | AAA1 | TKT1 | SPT2 | [HTY0] | [TUC0] | QUE1 |
| | SJG0 | ETT0 | [API1] | (GNA1) | | | | | |
| D | THY | HYB | TAN | ACS | TWA | | | | |
| E | | | | | | | | | |
| X | [VIC] | [CNB] | | | | | | | |

| APRIL 1987 | None |
|---|---|

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1987 (continued)

| MAY 1987 | | | | | | | | | 28/05 10:51 |
|---|---|---|---|---|---|---|---|---|---|
| A | (PET2) | IRT3 | TKT3 | PEN2 | (LNP2) | [PMG0] | | | |
| B | NOK2 | YAK3 | KGD0 | HRB2 | AQU1 | TFS3 | HYB0 | TAN1 | |
| C | LER1 | ESK1 | WNG0 | VAL0 | GTT0 | HAD0 | (YSS1) | GCK0 | COI1 |
| | SPT1 | QUE1 | ABG1 | ETT0 | | | | | |
| D | KIR | NUR | LNN | SV3 | KZN | NGK | KIV | BDV | THY |
| | ODE | OTT | EBR | FRD | TEN | SJG | HER | | |
| E | BFE | | | | | | | | |
| X | AAA | MPO | | | | | | | |

| JUNE 1987 | None |
|---|---|

| JULY 1987 | None |
|---|---|

| AUGUST 1987 | | | | | | | | | 07/08 13:00 C |
|---|---|---|---|---|---|---|---|---|---|
| A | (YAK1) | | | | | | | | |
| B | NOK1 | [PET1] | HRB2 | TAN1 | | | | | |
| C | KIR- | NUR1 | (MGD0) | LNN- | BFE1 | MEA1 | WNG1 | (IRT0) | NGK0 |
| | VAL0 | GTT0 | KIV1 | KGD0 | BDV3 | ODE2 | GCK0 | AAA0 | TEN1 |
| | ABG1 | SJG0 | [PMG0] | MPO1 | [GNA1] | | | | |
| D | LER | SV3 | KZN | HAD | VIC | THY | AQU | TFS | EBR |
| | COISPT | FRD | PEN | TUC | HYB | HER | ACS | TWA | AIA |
| E | OTT | | | | | | | | |
| X | ESK | TKT | QUE | [API] | | | | | |

## DOUBTFUL SOLAR-FLARE EFFECTS (sfe) 1987 (continued)

| SEPTEMBER | | | | | | | 08/09 | 07:36 | |
|---|---|---|---|---|---|---|---|---|---|
| A | KIR- | SV32 | WNG2 | HRB2 | THY3 | [OTT1] | COI3 | ABG3 | [AIA-] |
| B | NOK1 | NUR2 | LER1 | BFE2 | [MEA2] | IRT2 | NGK1 | VAL1 | HAD1 |
| | KIV2 | ODE2 | TFS2 | [FRD0] | [TUC0] | MPO2 | | | |
| C | YAK3 | MGD0 | LNN- | ESK1 | PET1 | GTT1 | KGD0 | BDV2 | [VIC1] |
| | YSS1 | AQU1 | TKT1 | EBR0 | SPT1 | HTY0 | QUE1 | LNP2 | [HON0] |
| | [SJG0] | HYB0 | GUA0 | ETT0 | PMG0 | GNA1 | HER0 | [ACS1] | [TWA1] |
| D | MMB | KAK | KNY | TEN | CNB | | | | |
| E | KZN | GCK | PEN | [PPT ] | | | | | |
| X | AAA | TAN | | | | | | | |

| SEPTEMBER | | | | | | | | 21/09 | 01:57 C |
|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | |
| B | (MEA2) | IRT0 | LNP3 | [AIA-] | | | | | |
| C | NOK0 | YAK1 | MGD0 | [WNG0] | PET1 | [NGK0] | [VAL0] | [GTT0] | [HAD0] |
| | KGD0 | YSS0 | [OTT1] | [GCK0] | MMB3 | AAA0 | [FRD0] | KAK3 | HTY3 |
| | (TUC0) | KNY3 | HON0 | ABG2 | [SJG0] | PMG0 | [MPO0] | GNA1 | [ACS0] |
| | [TWA0] | | | | | | | | |
| D | VIC | TKT | QUE | ETT | API | PPT | EYR | | |
| E | HYB | GUA | | | | | | | |
| X | CNB | | | | | | | | |

| OCTOBER | none |
|---|---|

| NOVEMBER | none |
|---|---|

| DECEMBER | none |
|---|---|

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IAGA Symposium No. 6, Symposium on Aurora and Magnetic Storms, Birkeland, 1967
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avenue d'Embrun, 05003 GAP cedex
Tél. : 92.53.17.00
Dépôt légal : 560 — Juillet 1993
Imprimé en France

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